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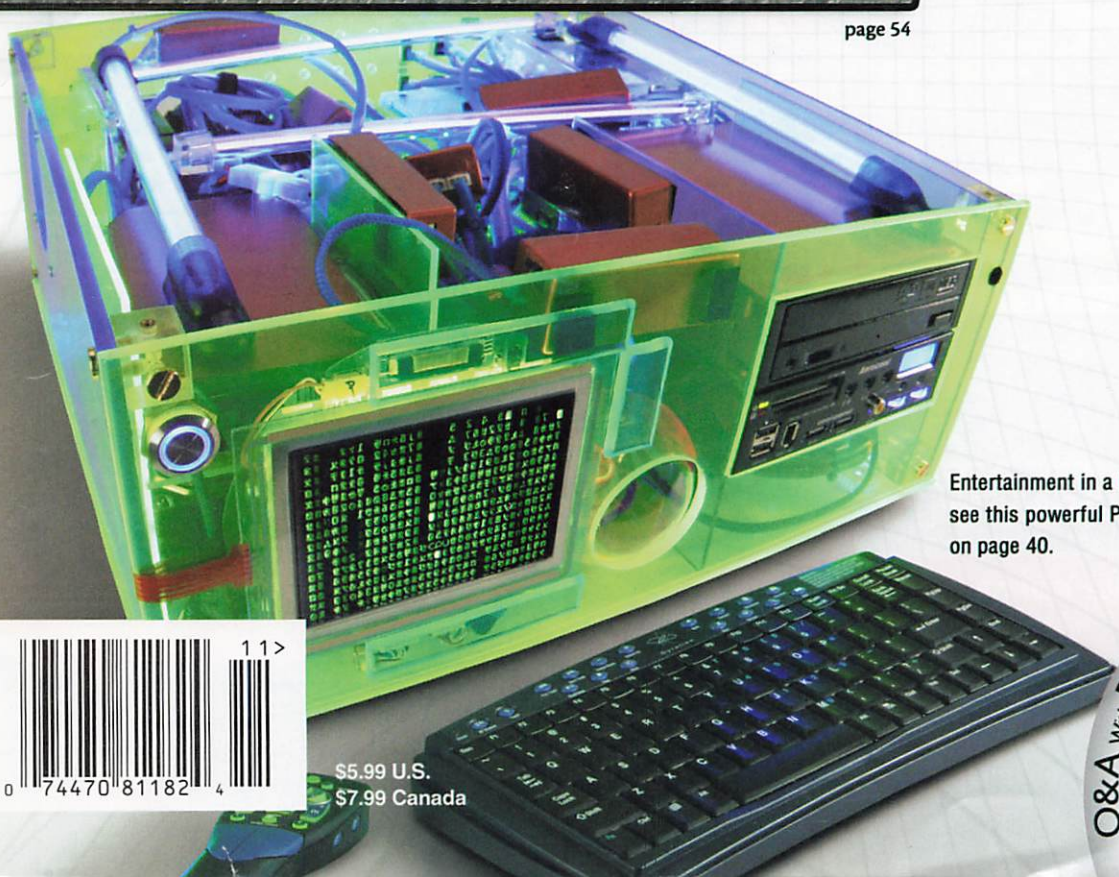

Entertainment in a box: see this powerful PVR on page 40.

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Tap Into Game Nostalgia
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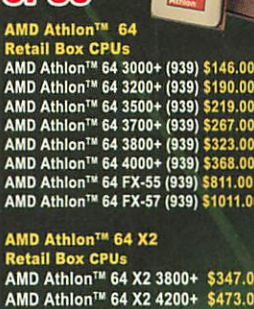

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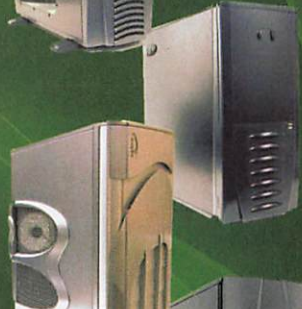

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AMD Athlon™ 64 3500+ 512K 90nm (939)
AMD Certified Heat Sink Fan
1 GB (2 pcs 512) DDR (400) PC-3200 OCZ
Western Digital 80GB SATA 8MB Cache 7200 RPM (WD800JD)
NEC ND-3520A-KIT-BL 16X Dual Layer DVD±RW
Mitsumi 1.44MB 3.5" Floppy Drive (Black)
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Plextor PX-716SA DVD±RW
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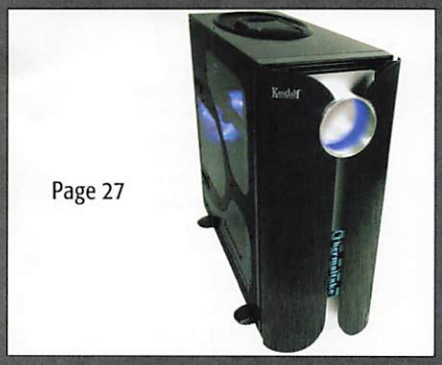
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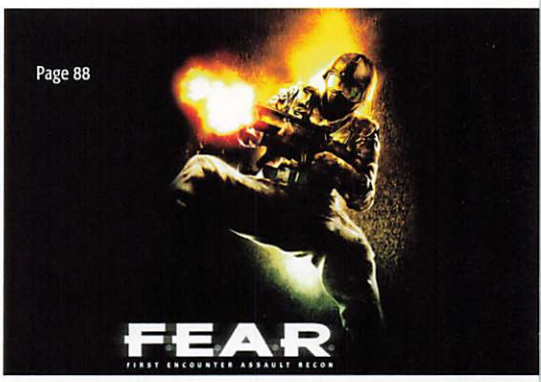

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Greetings From Samitland

So it's November, and I'm standing here in the fading blue LED glow that lights Samitland at night. (Samit loooves stuff that lights up, you know.) Pretty amazing that next month it will have been four years since *CPU* hit newsstands. Since the very first day, Samit has been the guiding force behind *CPU*, and with good reason. Of all the people I know who love technology, nobody eats, sleeps, lives, and breathes it like my friend Mr. Choudhuri.

Hmm, this is starting to sound like a eulogy, so let me get to the point: It's only natural that you, the reader, might have some questions and concerns at seeing some new guy show up in the pages of a magazine you've come to love. I understand completely, so let me assure you that we've no sweeping changes planned for *CPU*. We're not going to go rearranging the departments or changing the fonts. True, I'm very partial to Helvetica, but you come first.

Am I as much of a geek as Samit, you ask? Hardly a fair question because so few on the planet are. I have never, for example, worked at a computer store for free so I could camp out there overnight and play Elite. Nor have I chosen one job over another solely on the basis that the first company had Pentiums while the other was still mired in 486 mediocrity. Really, when you get right to the heart of the matter, Samit pretty much out-geeks everybody but a select few. The only difference between Samit and, say, Bill Gates is $46 billion and change.

We'll get to know each other better in the issues to come, but for now let me say this; I'm gonna do my best to carry on in Samit's footsteps and make *CPU* the best computer mag on the stands. And, as always, your feedback is an important part of that process, so please feel free to continue to offer your comments, questions, and suggestions in the *CPU* forums or by emailing us at editor@cpumag.com. Enjoy this issue, and we'll see you here next month.

Samit: *We'll see you next month. Excuse me, Chris? They won't see me next month? Look, you can't remove the Insidious One that easily. Oh—hello, security. No, no trouble. ::sigh:: Well, at least I'm leaving* CPU *in capable hands. Have to let go sometime, right? For those of you who supported my endeavours with* CPU *from the beginning, I thank you: Wife Julie, Mama and Baba (I miss you), Valenzuela/Ramachandrans, Bokowskis, Jennie S., Jeff V., Dr. Narendra N., Dan G., Brian B., Damon M., Dan S., and the many others that I have no room to mention by name (writers, columnists, and the in-house teams). Last but not least—the biggest thanks are to* ***you, the reader****. You got us to where we are today. It's going to be a pleasure joining your ranks as I put down roots in rainy Seattle. Don't go anywhere—next month is going to sizzle.*

Chris Trumble, Publication Editor, ***CPU***

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Gotcha.
Here it is.

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AVOX | Jukebox

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The AVOX Jukebox is the easiest way to turn your 2.5" hard drive into a portable audio/video player. With a simple to use ON SCREEN DISPLAY, the AVOX Jukebox can play movies, music, or a slideshow of your pictures when connected to the AV inputs on any television. Since it also doubles as a portable enclosure, you can store your documents, programs, or any other data on the AVOX Jukebox as well. With the built-in high speed USB 2.0 interface, files can be transfer up to 40 times faster than USB 1.1. Easy to use, sleek, and compact, the AVOX Jukebox is the perfect way to make your media as mobile as you are.

For more information on this product, please go to
http://www.vantecusa.com/products/avox/p_avx100tx.html

Video

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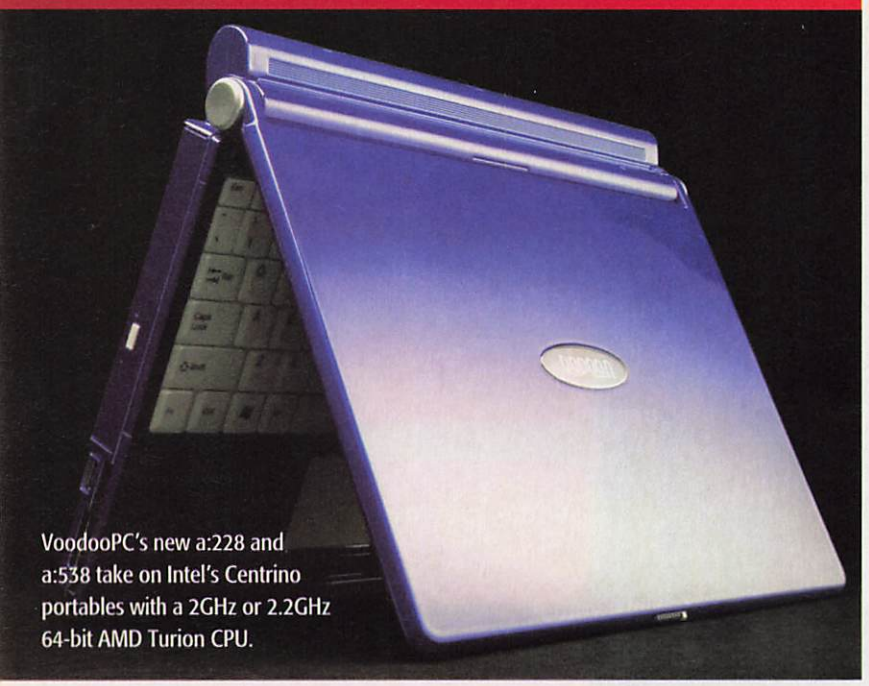
Compiled by
Steve Smith



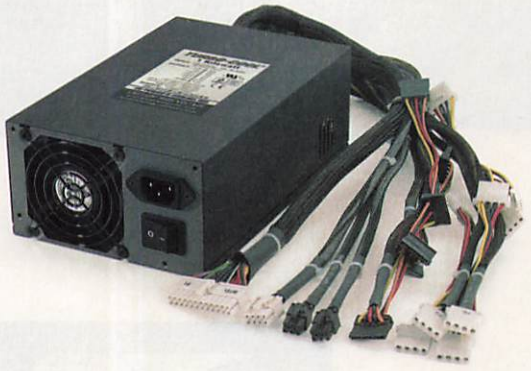
VoodooPC's new a:228 and a:538 take on Intel's Centrino portables with a 2GHz or 2.2GHz 64-bit AMD Turion CPU.

New Turions Up AMD's Laptop Game

Partnering with specialty PC vendor VoodooPC, AMD has launched two new fast and efficient 64-bit CPUs for gaming portables. The Turion 64 models MT-40 (2.2GHz) and MT-37 (2GHz) should be appearing as you read this in the Voodoo ENVY Middleweight a:538 and the ENVY Featherweight a:228, respectively. Both MT models are designed to maximize speed but keep power consumption low. The ENVY a:538 was not available as we went to press, but the ENVY a:228 weighs only 4 pounds and costs about $2,000 when equipped with the MT-37. ▲

One Kilowatt & Counting

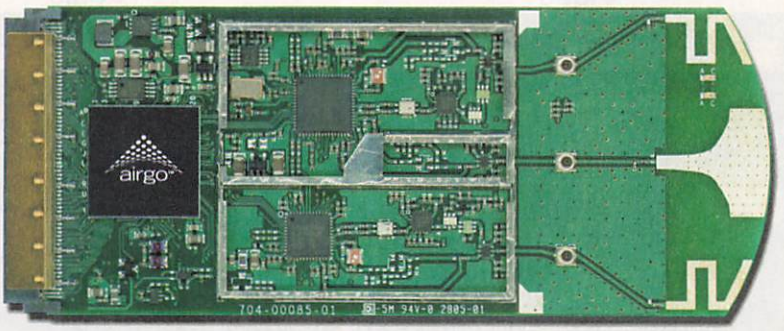
We're not sure how many add-ons, mods, and peripherals it takes to max out PC Power & Cooling's new Turbo-Cool 1KW power supply, but we're guessing that more than a few mod-mad *CPU* readers will find a way soon enough. With 1,000 watts of continuous power and 66 amps of output densely packed into an ATX form factor, the Turbo-Cool 1KW is an upgrade of PCPC's current 850-watt behemoth. Improved electronic components and thermal efficiency now handle the full kilowatt load. The $489 unit may sound pricey, but if you are drawing anything close to 1KW of power for your PC, then it's hard to imagine that cost is an issue. ▲



PC Power & Cooling's new 1,000W power supply can run your PC—or a small jet aircraft.

Wireless Outstrips Wires With Airgo's 3G MIMO

Has wireless connectivity finally outclocked a wired connection? Airgo Networks, makers of the chipset behind many of the Pre-N MIMO Wi-Fi routers now on the market, says its new third-generation AGN300 802.11a/b/g chipset can hit 240Mbps of throughout, compared to the 100Mbps standard for Ethernet. The True MIMO technology transmits multiple radio signals in the same channel to achieve up to 20 times the performance of standard Wi-Fi networks and larger coverage areas. While the industry still waits for final approval of a MIMO-based 802.11n specification, router firms such as Belkin and Linksys are releasing products based on Airgo's Pre-N chipsets, and Airgo expects to see AGN300-powered products in stores by the end of 2005. ▲



Using multiple radio signals in a single channel, third-generation MIMO promises faster-than-Ethernet Wi-Fi speeds by early 2006.

HP's Next-Generation TV Finally Gets PC-Compatible

Next-generation HP HDTV models that speak directly to multimedia on your PC's hard drive.

While Intel hopes to make PCs work seamlessly with home theaters, HP is designing next-gen TVs that talk back to the network. HP recently unveiled HDTV prototypes with built-in digital media receivers so that future TVs will communicate with any PC or media device on a wired or wireless home network. HP is working around the need for intermediary media streaming boxes or dedicated Media Center PCs by letting the TV directly access hard drives and pull multimedia files onto the living room screen. For those chronic HDTV procrastinators who keep putting off their buying decision, HP is giving you more reason to wait. These souped-up DLP microdisplays (models up to 65 inches) won't hit stores until summer 2006. ▲

Hardware Mole

Intel's Viiv-acious Home Theater Plan

In early 2006, Intel will introduce a new cluster of technologies and certifications designed to play well with home theaters. Intel Viiv PCs will have dual-core CPUs, remote control, instant on/off operations, DVR capabilities, 7.1-channel audio support, software that streamlines network/Wi-Fi setup, and all Viiv PCs will ship with Microsoft Windows XP Media Center Edition. Also, systems with Viiv technology will come in several form factors, including units resembling slim DVD players and conventional PC towers. Less clear, however, is how this latest Intel branding campaign offers much more than the familiar MCE PC, let alone any particular meaning behind this "Viiv" moniker. Viiv? What does that mean? ▲

Microsoft's New Comfort Zone

There is no middle ground with Microsoft's Natural keyboards; you either swear by the ergonomic superiority of their split, tilted keypad design, or you curse the many typos it causes. Lovers of the bent wing design get to enjoy the next generation with the Natural Ergonomic Keyboard 4000. Changes in the keypad angles and curvatures, a reverse-tilt wrist rest, and a tightening of the key positions will further ease the stress of repetitive typing actions, says Microsoft. This is the first major redesign of the Natural line in more than 10 years and employs ergonomic research from a major university. OK, professor, but for some of us this "natural" design just leads *naturally* to endless typos. ▲

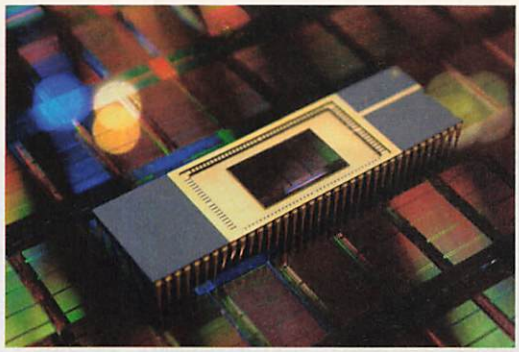
Microsoft says that subtle changes in keypad curvature and angularity make its newly redesigned Natural Keyboard an ergonomic breakthrough.

CrossFire Goes Cross-Platform

ATI's upcoming and long-awaited CrossFire solution gains some unexpected flexibility with the announcement that the dual-card array will work on Intel 955X chipsets. Previously, ATI planned on using the PCI Express CrossFire for its own RD480 motherboards, but expanding support to Intel boards may help ATI catch up to Nvidia and the long lead its SLI dual-card array has achieved this year. Although (very) late to market, ATI's CrossFire is promising better configuration flexibility than Nvidia and even broader 3D game support. ▲

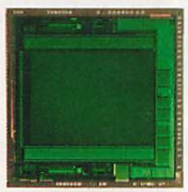
Compiled by DeanTakahashi

Samsung Announces 16Gb Flash Memory Chip



South Korea's Samsung Electronics announced a 16Gb NAND flash memory chip (available late 2006) that could usher in a new era in data storage. The chip will have the smallest cell size and highest density of any storage chip available now, making it ideal for storing an enormous amount of data on small portable devices. The chip will also store 2GB of data and will have more than 16.4 billion functional transistors. Packaged in a memory card with 16 chips, the Samsung chips could store the equivalent of 200 years of a 40-page daily newspaper, 8,000 digital music files, or 32 hours of DVD-quality movies on a single memory card. Samsung will use its 50nm chip technology to build the chip, which is the first of its kind to enter into production. The better reliability of chips vs. hard drives could tempt companies such as Apple to move more of its iPod music player models to flash technology. ▲

Micron Technology Launches 3MP & 5MP CMOS Image Sensors



Micron Technology in Boise, Idaho, makes its bread and butter with memory chips. But the company's imaging group in San Jose, Calif., has been making CMOS image sensors for digital cameras for three years. The San Jose facility has now produced two new chips, a 3.1MP version (MT9T012) and a 5MP version (MT9P001) that can capture images at levels worthy of digital cameras. Robert Gove, vice president of Micron's imaging group, says manufacturers could use the chips in ultra-thin, digital-still cameras or camera phones, which may hit the market next year. Camera phones with either the 3.1MP or 5MP chip will feature improved image resolution and high dynamic range for pictures with difficult lighting. The 3MP chips will sell for $7 wholesale and will ship in the fourth quarter of this year. The 5MP chips will sell for $10 wholesale and will ship in the first quarter of 2006. ▲

Watching The Chips Fall

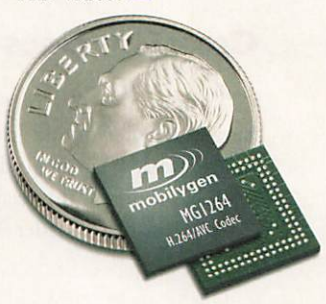
Here is pricing information for AMD and Intel CPUs.

*Retail price
** Manufacturer's price per 1,000 units
Other current prices, if indicated, are lowest OEM prices available through Pricegrabber.com

CPU	Released	Original price	Current price	Last month's price
AMD Athlon 64 3500+	6/1/2004	$500**	$237	$218
AMD Athlon 64 3700+	6/1/2004	$710**	$266	$260
AMD Athlon 64 3800+	6/1/2004	$720**	$357	$327
AMD Athlon 64 4000+	10/19/2004	$729**	$393	$372
AMD Athlon 64 FX-55	10/19/2004	$827**	$809	$789
AMD Athlon 64 FX-57	6/27/2005	$1031**	$1,059	$1,015
AMD Athlon 64 X2 Dual-Core 3800+	8/1/2005	$354**	$359	$354**
AMD Athlon 64 X2 Dual-Core 4200+	5/31/2005	$537**	$473	$519
AMD Athlon 64 X2 Dual-Core 4400+	5/31/2005	$581**	$549	$537
AMD Athlon 64 X2 Dual-Core 4600+	5/31/2005	$803**	$688	$601
Intel Pentium 4 Extreme Edition 3.73GHz 2 MB cache 800MHz FSB	2/21/2005	$999**	$1,004	$1,001
Intel Pentium Processor Extreme Edition 840 3.2GHz dual core	4/18/2005	$999**	$1,005	$999
Intel Pentium 4 530 3GHz 1MB cache 800MHz FSB 90nm	6/27/2004	$218**	$177*	$171*
Intel Pentium 4 540 3.2GHz 1MB cache 800MHz FSB 90nm	6/27/2004	$278**	$189*	$189*
Intel Pentium 4 550 3.4GHz 1MB cache 800MHz FSB 90nm	6/27/2004	$417**	286*	$249**
Intel Pentium 4 630 3GHz 2MB cache 800MHz FSB 90nm	2/21/2005	$224**	$175*	$177*
Intel Pentium 4 640 3.2GHz 2MB cache 800MHz FSB 90nm	2/21/2005	$273**	$199*	$215*
Intel Pentium 4 650 3.4GHz 2MB cache 800MHz FSB 90nm	2/21/2005	$401**	$262*	$270*
Intel Pentium 4 660 3.6GHz 2MB cache 800MHz FSB 90nm	2/21/2005	$605**	$396*	$396*
Intel Pentium 4 670 3.8GHz 2MB cache 800MHz FSB 90nm	5/26/2005	$849**	$610*	$618*
Intel Pentium D 2.8GHz dual-core 2MB cache 800MHz FSB 90nm	5/26/2005	$241**	$239*	$232*
Intel Pentium D 3GHz dual-core 2MB cache 800MHz FSB 90nm	5/26/2005	$316**	$313*	$272*
Intel Pentium D 3.2GHz dual-core 2MB cache 800MHz FSB 90nm	5/26/2005	$530**	$537*	$539*

Mobilygen Tackles Low-Power H.264 Video Codecs

Video chips are a dime a dozen these days–even those that compress, or encode, images, as well as those that play back, or decode, images. But Mobilygen, a 6-year-old start-up in Santa Clara, Calif., has figured out a way to create video compression at very low power levels. Mobilygen's chip, the MG 1264, can compress and play back data in the increasingly popular H.264 video format while consuming as little as a tenth of a watt of power. (Many competitors' chips require 1 watt or more of power.) The company has launched two chips this year and plans to create a third one that can process high-definition video at low power levels. Joseph Perl, Mobilygen CEO, says these chips will bring about lightweight HD camcorders, better digital cameras, and even camera phones that can record HD video. ▲



BuzzMachine
by Jeff Jarvis
Tag Archive
Dell hell
I'd pretty much left behind the Dell Hell but, what the hell...
My son still has a Dell laptop (what kind of father am I?) and he had two hardware problems. Since we paid for the super-duper home service, the technician came to our house. But — surprise, surprise — Dell sent him with the wrong parts. He got on the phone to Dell — demanding to know whether he was talking to America, by the way — and got the runaround and they hung up on him twice. He's their guy.
So I'm not alone.
: But wait: Dell is opening a new customer service center in Oklahoma.
General
Search
Archives

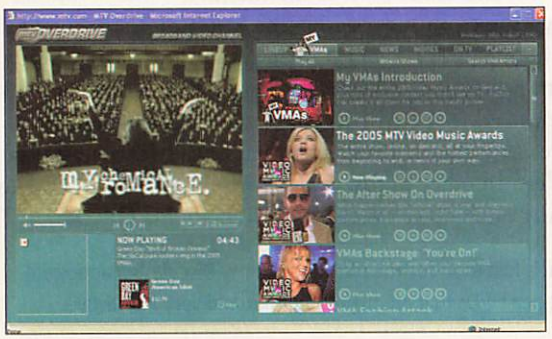
Blogger Jeff Jarvis became the blog hit of this past summer with his ongoing tales of shoddy customer service from Dell.

Dell Gets Scorched In Blogosphere Hell

Boy did Dell customer service brush off the wrong guy! In a stunning demonstration of how powerful the blogosphere is in making and breaking brand reputations, the leading PC maker caught serious hell in August. When tech writer Jeff Jarvis' Dell computer failed, he chronicled the runaround he received from customer support as the "Dell Hell" saga on his popular BuzzMachine.com blog. The thread went super-viral, enjoying quotes and links from scores of other sites to become one of the most viewed blog topics of this past summer. The epic came to a head on Aug. 17, 2005, with Jarvis's open letter to Michael Dell warning that "your product was a lemon and your customer service was appalling," becoming the third most linked to blog post for that day on the entire Web. Somebody at Dell must be wishing that the company had just offered to fix Jarvis' problem on the first call. ▲

MTV Grows A "Long Tail" Online

Only 8 million viewers tuned in to this year's "MTV Video Music Awards" in late August, but that 22% drop-off from last year may not be a problem for the forward-thinking media brand. At MTV's new Overdrive broadband channel (www.mtv.com/overdrive), the VMAs prompted more than 11 million music video downloads. Media experts call the Internet the "long tail" for diminishing TV audiences, a place where a wide inventory of more diverse content lives on and accrues larger audiences than a network can capture in any one- or two-hour TV slot. Much of the original VMA broadcast is available in segments at Overdrive. ▲



Why sit through the tedium of the "MTV Video Music Awards" when you can cherry-pick the best parts on MTV's Overdrive channel?

New On The 'Net

Did You Hear That Dress She Was Wearing?

Weaving high fashion and low-tech into a gloriously strange new blend, SonicFabric.com is offering apparel made from 50% cotton and 50% leftover audio tape. No, really. Strands of tape containing old music and stray sounds form the outer layer of these handbags and dresses, which actually render sound if you swipe tape heads across their surface. The site even offers instructions for disemboweling an old Sony Walkman in order to play back your clothing. Now that's paying a high price for fashion. ▲

Yahoo! World News Tonight?

As more of us rely on headline aggregators to monitor news online, portals and search engines are becoming serious players in the journalism business. Yahoo! makes this transition by hiring a veteran CNN and NBC war correspondent to host Kevin Sites In The Hot Zone (hotzone.yahoo.com). Sites will journey solo to areas of conflict and communicate to Yahoo! readers with a backpack of gadgetry (digital cameras, satellite phones, and a solar-powered generator). No word on whether Geraldo Rivera had first refusal right on this macho gig. ▲

TBS Puts New Games On The Broadband Tap

Along with a new TV season, autumn is the time for major broadband channel launches. As you read this, TBS should be unveiling its GameTap.com online games network. This genuine broadband channel will give subscribers access to thousands of old and recent PC games along with a full slate of original video programming on game design, tips, and related pop culture. Let's hope this project lasts longer than some of the sitcoms we are already suffering through this TV season. ▲

Way beyond TiVo, the new Webradio Recorder lets you tag and store tracks from Internet radio shows for later playback and burning.

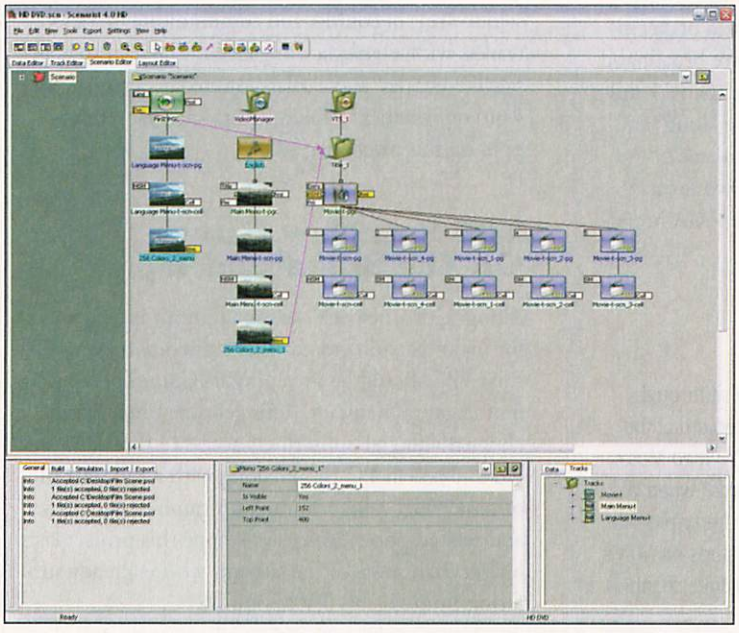
Internet Gets TiVo-ed

Now reaching about 6.7 million listeners a week, Internet radio is no longer a dweeby hobby. In fact, the medium now has its own DVR software in Webradio Recorder from Magix (www.magix.com). The $29.99 program not only records multiple Internet radio programs from a 2,000-station roster but even assigns names to music tracks and burns programs onto disc media. In true TiVo fashion, the recorder also keeps live radio in a background cache, so you can grab a copy of an entire tune even if you press the record button at midpoint. We especially like the recording filter that lets you designate the artists you do and don't want to hear. Hmm. A radio world without the newest pop princess' song; we love technology. ▲

The Game Police Are Not Amused

When third-party hacks of Rockstar's Grand Theft Auto: San Andreas revealed hidden sexual content, the ESRB (Entertainment Software Rating Board) was more surprised and embarrassed than anyone. You see, the ESRB's job is to evaluate game content before release and rate it accurately. The ESRB quickly retagged GTA: San Andreas an AO (Adults Only) title, but also put publishers on notice: Don't hide code from the ESRB. The ratings board asked publishers to review all games dating back to September 2004 for offensive hidden code and advised them that any code involving "edited" or "unplayable" content must be fully deleted from a disc before its release. ▲

Not happy about missing the hidden sexual content in Grand Theft Auto: San Andreas, the ESRB is asking itself whether games it rates really are safe to play.



Hi-Def DVD Is More Than A Pretty Face

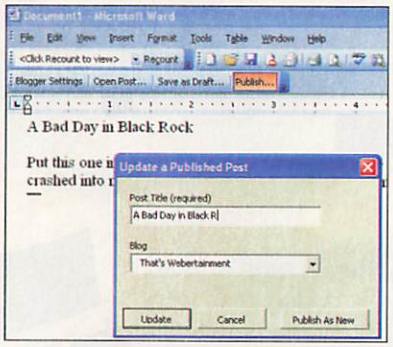
Next-gen, high-def DVDs are not just about having 15GB or more space on a movie disc. The upcoming Blu-ray and HD-DVD formats promise radically new film complements such as pop-up menus synchronized with movie content and direct links to the Internet. Sonic Solutions (www.sonic.com) is releasing the first professional tool kits for both platforms, which offer a peek at what to expect. With next-gen discs, users get faster, direct access to menus and settings, synched annotations, and content refreshes from the Internet such as links to the latest film trailers. In other words, expect high-def DVDs of 2006 to finally catch up to the functionality of a PC CD. ▲

Sonic's first tools for HD-DVD and Blu-ray Disc design anticipate next-gen DVDs that are highly complex and very interactive.

Software Shorts

Blogger Gets Word-Friendly

Google's new Blogger For Word plug-in is a terrific, seamless way of sending text from Microsoft Word directly to your Blogger.com site. Word gets a new toolbar from which you can publish text in your current window without opening your browser. Blogger For Word can even title your new post automatically and (we love this) recall the past 15 posts for further editing and reposting. Now there's no excuse for letting your public diary grow stale and forgotten. ▲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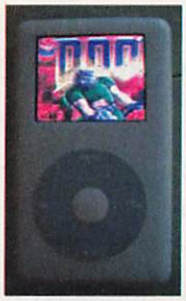
Blogger Settings Open Post... Save as Draft... Publish...
A Bad Day in Black Rock
Update a Published Post
Post Title (required)
A Bad Day in Black R
Blog
That's Webertainment
Update
Cancel
Publish As New

No more outdated blogs now that Blogger For Word sends new posts directly from the word processor.

PSP Browser Developer Buys Palm

The most recognized PDA OS got a new owner when Japanese mobile developer Access bought PalmSource, which supplies the OS to Palm, a separate company that makes the hardware. Despite the success of PDA/phone hybrids, such as the Treo, the Palm OS has been in decline in recent years, but Access may have plans to elevate the OS in the Chinese market. And the company isn't short of high-profile projects; Access is responsible for the new PSP Web browser. ▲

Soon after supplying Sony with the ingenious mobile browser for the PSP, Access buys PalmSource and its well-known PDA OS.



Enterprising hackers have found a way to run the original Doom on an iPod.

iDoom?

We have to imagine that the only reason for playing Doom on a photo iPod is because, well, to show that you can. The uber-dweebs at the iPod Linux Project (ipodlinux.org) found a way to make the original PC game and even its mods work on an iPod running a version of Linux. Be forewarned, the installation procedure isn't for the faint-hearted, nor is the control scheme. The iPod's rewind and fast forward commands map as left and right game movements, and an artful leftward swipe on the touch-sensitive controller translates as the enter command. ▲

BIOS Upgrades Available Online

Compiled by Kevin Savetz

Before you send another motherboard to the landfill, consider upgrading the BIOS and giving your PC a new outlook on life. Here are a few recently released upgrades. Readers can check out www.cpumag.com/cpunov05/bios to see our entire upgrade list.

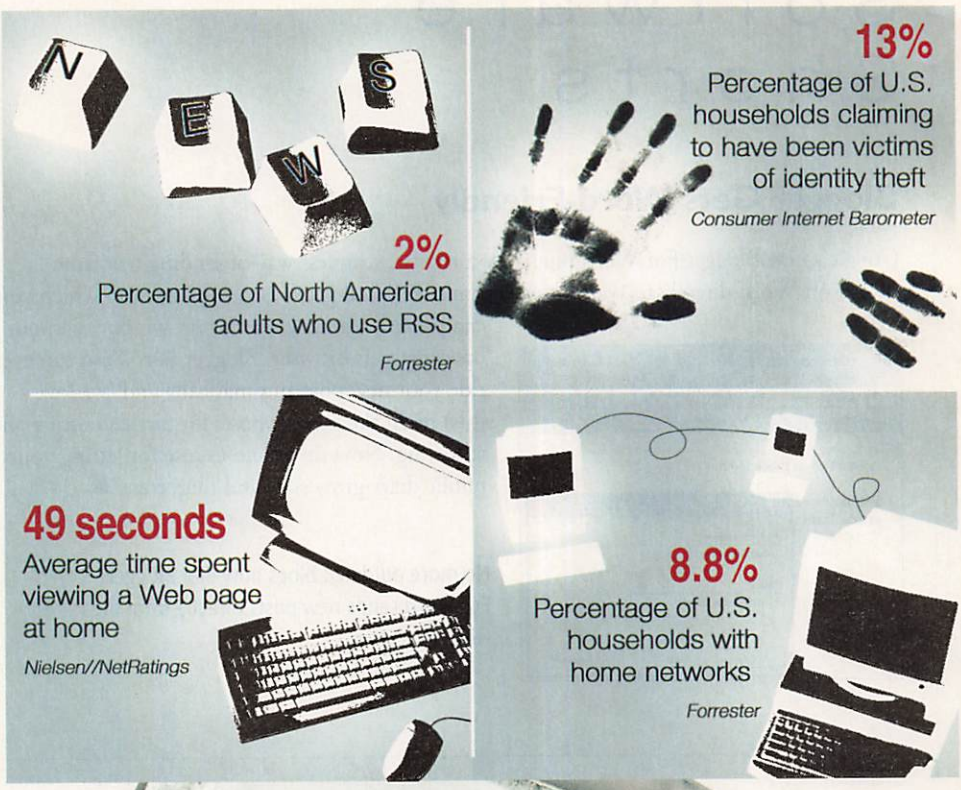
Motherboard	Date Available	URL
Abit AL8	09/12/2005	www.abit-usa.com/downloads/bios/bios_revision.php?categories=1&model=281
AOpen s760GXm-US	08/25/2005	download.aopen.com.tw/
Asus P5GD1	09/09/2005	support.asus.com/download/download.aspx?SLanguage=en-us
Asus P5GD1 Pro	09/09/2005	support.asus.com/download/download.aspx
Biostar P4M80-M4	08/15/2005	www.biostar-usa.com/mbdownloads.asp?model=p4m80-m4
ECS K8T890-A	09/10/2005	www.ecsusa.com/downloads/downloads_main.cfm?to=Motherboard

Compiled by Steve Smith

The Job Search

If you're MMOG-savvy, then you'll know what a tony job it is to be Lead Programmer at NCSoft. The publisher of Guild Wars and City Of Heroes needs someone to command development of its next line of hits. In addition to knowing the difference between Level 3 spell casting and a bone scimitar, read up on your C++ and TCP/IP programming, client/server architecture, and network security. Oh, and make sure that you've actually worked on a shipped online game product because they don't hand jobs like this out to any old code jockey. And although actual MMOG playing experience is a plus for landing this plumb of a job, you better be able to step away from that virtual world every so often to interact with real humans. Lead programmers actually lead and need requisite social and managerial skills.

NCSOFT



Blogs Are The New News

Blog watching is deeply woven into our daily surfing habits, with 50 million Americans having visited a blog in Q1 2005. The top 10 blogs represent a fair mix of politics, sex, gossip, silly news, and technophilia.

Site	Unique Visitors
Freerepublic.com	3,633,000
DrudgeReport.com	2,266,000
Fleshbot.com	1,186,000
Gawker.com	1,136,000
Fark.com	1,125,000
Slashdot.org	911,000
Gizmodo.com	887,000
Defamer.com	883,000
BoingBoing.net	849,000
Engadget.com	744,000
MetaFilter.com	614,000

Source: comScore

S12

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~ www.silentpcreview.com

"The Seasonic S12-500 is stable and powerful for the gamers and overclockers."
~ www.amdzone.com

NVIDIA SLI READY

S12-600

Intel Pentium 4 Prescott

AMD Athlon 64/ Athlon 64FX

ATX12V V2.0
EPS 12V

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- Ultra Ventilation [Honey Comb Structure]
- Active Power Factor Correction [99% PF]
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newegg.com | Silicon Acoustics | MICRO CENTER Online | Fry's Outpost.com | pc alchemy The HTPC Store.

Polywell Computers American made Computers | VICIOUS PC | Puget CUSTOM COMPUTERS

WWW.SEASONICUSA.COM

I64 Geek

by Alex St. John

Kids today can't code. When I was a young geek, all my friends were dying to get their hands on the exciting new thinking machines that were just becoming accessible to consumers. My first personal computer was a Commodore VIC-20, which I have very fond memories of. I learned to program by copying code snippets from early computer nerd magazines. I very quickly discovered that I liked the power of 6502 assembly language programming much better than the slow, limited version of BASIC that the VIC-20 came with. By the time I was a teenager, I was programming in 6502, VAX, and 8086 assembly reasonably fluently. Naturally, the only practical use for such programming power is to write games, which I pursued with great enthusiasm until early game companies started making games much better than the ones I had the time and resources to make for myself.

Years later I was hired by Microsoft, but my dirty secret was that I had become a Mac programmer. When I started learning the Windows API, I found the vast tangle of layered APIs a daunting and dull exercise to master. Windows programming was simply no fun. Everything I wanted to touch and adapt was buried under layers of OS baggage. My disgust for Windows architecture was a factor in the later evolution of DirectX, which started with the very pure and simple vision of shoving Windows out of the way so that game developers could have maximum access to the media hardware and system resources they needed to make great games. The highest compliment a PC game developer ever paid the DirectX team was saying that we'd made the PC almost as fun to write games for as the Amiga.

These days I'm running my own company and have very little time for the coding that I love, but on my spare weekends, I pick up Microsoft Visual Studio and play with C#. I have to admit that, like Java, C# is a fun language to code in, but once again I find myself wading through a vast, bottomless pit of tangled Windows APIs to do anything interesting. Finally surrendering to my primal coding instincts, I went to Intel's Web site and found buried very deeply document 245319.pdf, "The Intel Itanium Architecture Software Developer's Manual, Volume III, Instruction Set Reference." It's been many years since I wrote my first 80386 assembly code game engine, and the modern Intel architecture has evolved in many wondrous ways since then. Seemingly limitless general purpose registers, 64-bit instructions, fast process switching instructions, powerful memory virtualization techniques, and, most interestingly, powerful new OS virtualization techniques.

The I64 is designed to allow the CPU to run multiple OSes concurrently, each thinking it has full access to the CPU's resources, memory, and hardware and blind to other protected mode OS instances running simultaneously. What does this mean? It means that it's technically possible for the Windows OS to be jacked up on stilts and run like an application from within another OS, like Linux with full Windows app compatibility and performance. There are apps like VMware that accomplish this effect today, but they do it by effectively patching the assembly code for the OSes they're virtualizing in real time, which isn't as fast or clean as Intel's new CPU trick.

Further searching for an I64 bit assembly language compiler led me to this little marvel: MenuetOS (www.menuetos.org). A pure assembly language, protected-mode, open-source, 64-bit OS that fits uncompressed on a single floppy disk. Now, if I was a kid wanting to learn to love programming today and turned off by the expense and morass that is Windows programming, this is the place I would start playing. Mind you, this is the deep end of computing, but you wouldn't be reading *CPU* if you didn't love understanding how your computer really works.

For those of you who aren't crazy bitheads, it pains me to admit it, but learning to write Web pages in JavaScript—although far less "challenging"—is also a very fun and accessible modern way to learn to code, and there are lots of great books on how to do it. ▲

Alex St. John was one of the founding creators of Microsoft's DirectX technology. He is the subject of the book "Renegades Of The Empire" about the creation of DirectX and Chromeffects, an early effort by Microsoft to create a multimedia browser. Today Alex is President and CEO of WildTangent Inc., a technology company devoted to delivering CD-ROM-quality entertainment content over the Web.

Mind you, this is the deep end of computing, but you wouldn't be reading *CPU* if you didn't love understanding how your computer really works.

Send your thoughts to TheSaint@cpumag.com.

DREAM HARDWARE

These Gizmos Don't Sing It, They Bring It

Floor it. Head for the surface. And breach majestically, just in time for your buddy on the shore to snap a wall-sized, ultra high-res photo of you in your new submarine. Don't worry about the radar gun warning that you see in your helmet—that young peace officer on the dock just wants to see how fast you're going as you dive back into the water.

by Marty Sems

NoLand Bionic Dolphin

Thomas "Doc" Rowe is a man with a porpoise. For the last 30 years, he's been crafting VASHes (Variable Attitude Submersible Hydrofoils), or personal submarine/speedboats, shaped like Aquaman's best friend, the dolphin. Rowe has been perpetually working on new custom and prototype Bionic Dolphins, while his company, NoLand Corporation (www.bionicdolphin.com), sets up production opportunities. NoLand is planning to release a 5.5-meter, two-seat training Dolphin to resorts in the next year or two for about $60,000. After safety training and certification, drivers will receive keycards to start their Dolphins, which are designed to float even if flooded. Oh, and the latest prototype packs a 400hp Corvette LS2 aluminum small block. 'Ware the blowhole.

SportVue MC2

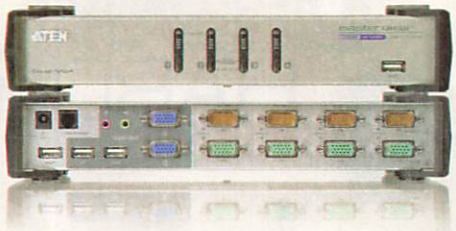
Into the valley of cops rode the Honda 600. Radar to the right of us! Lidar to the left of us! . . . And we saw it all displayed on our helmet's visor, thanks to our SportVue MC2 (www.sportvue.com). When connected to your existing radar detector, the MC2 heads-up display gadget gives you immediate visual notice that you're under the gun, along with your speed, gear, and revs. You don't even have to take your eyes off the road. Fantastically, the MC2 only costs $389, so you won't have to charge it like some light brigades we could mention. O the wild charge we made! Noble Honda 600!

Phase One P 45

It's time for another quantum leap in professional digital photography. The new P 45 camera back from Phase One (www.phaseone.com) turns your full-format Hasselblad, Mamiya, or Contax into a 39MP wonder. (Check the site for camera compatibility.) The 4:3 CCD can capture 16-bit RGB color and can snap up to 35 frames per minute of mammoth 7,216 x 5,412 images. The image files tally 117MB each, by the way, so beef up your upload platform. Phase One says that the P 45 is on track to appear by the end of the year for $29,990 to $33,990. To recap: Thirty. Nine. Megapixels.

It's Time To Switch Things Up

If You Have The Peripherals, We Have The KVMs



Master View Dual-View CS-1744
$310.99
Aten
www.aten-usa.com

We're sure there are power users who only own one PC; we just don't know any. For years, the bulk of consumer PCs sold have gone into multiple-PC households. This has been going on so long, many of us have more systems in storage than in use. You could put those forgotten friends to work, but who has the space (or money) for more sets of peripherals? Well, that's what KVM (keyboard, video, monitor) switches are for. When last we looked at KVMs, the world still revolved around PS/2, and the first dual-VGA switches hadn't appeared yet. Fortunately, things have changed.

For testing, I used a midtower, two notebooks, and an nForce4 configuration on a test bench and also snagged two MAG 19-inch LCDs, a Sennheiser PC 160 stereo headset, and a Logitech Cordless Desktop MX 3100. Cordless peripherals are notoriously problematic for KVM switches, and I had to replace the 3100's mouse with a corded MX 500. For USB peripherals I used a Samsung laser printer and a Corsair Voyager USB flash drive.

Aten Master View Dual-View CS-1744

The compact, flexible CS-1744 is a 1-to-4 (one user to four CPUs) dual-VGA KVM switch with all the right bells and whistles. The unit is a clean metallic grey with four sets of LED-lit buttons and one USB port up front. In back are twin VGA, audio, and mouse and keyboard (both USB) ports, and another USB port. Aten bundles four sets of 6-foot cables with large, easy-to-grip screws. One cable has a VGA connector and USB cable for a mouse and keyboard, while the other splits into the second VGA cable with mic and stereo plugs. Both plugs come with rubber caps tethered to the wire. The overall impression is one of solidity and attention to quality.

Like most KVM switches, Aten provides manual and hotkey switching. The cool thing is that you can switch the KVM, audio, and USB foci together or independently. For example, pressing Scroll Lock-Scroll Lock-2-ENTER switches KVM, audio, and USB to the second set of ports (system No. 2). At front each system button has a yellow and green LED inside of it for KVM and USB/audio, respectively. When the switch detects a system on that port, the LED is dim. When the focus is active for that port, the LED is bright. Briefly pressing a port button transfers the focus. Holding the button two seconds transfers everything. Like most competitors, Aten doesn't distinguish between a populated port and an empty one, so auto-scanning, which advances the switch's foci to the next port every five seconds, shows five seconds of black instead of skipping ahead.

You can customize hotkey settings, and you get a special cable for firmware upgrades. Upon switching ports I noticed the new focus system would immediately go through a brief USB PnP recognition process. Sometimes a key would repeat several times during typing a few seconds after switching. More problematic was microphone performance. The audio through the KVM had a narrower range, but at least the clarity stayed good. Mic recordings, though, sounded hollow and had a noticeable buzz. It took two seconds for mouse functionality to pop up on a new port, and my USB printer shared to each system effortlessly. I also liked that the switch recognized the media control buttons on my cordless Logitech keyboard, even though I had to use a separate USB mouse.

Audio hitches aside, the CS-1744 is a very satisfying switch at a reasonable price, considering the cabling that is included.

Belkin F1DH104U

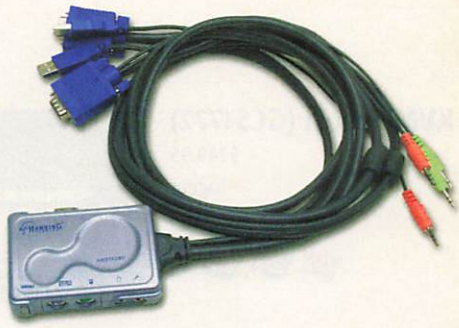
The F1DH104U is virtually identical to Belkin's F1DS104T externally, but it replaces the F1DS104T's PS/2 ports with a second set of VGA ports, builds the audio and USB into the all-in-one cable bundle, and adds two USB peripheral ports. To keep things simple (maybe too simple), Belkin doesn't provide for the separation of KVM, audio, and USB foci as some competitors do. This makes for a quicker learning curve but might prove cumbersome to some users. In addition to front-mounted manual switching buttons, double-Scroll Lock hotkey options include moving to the next or last port, advancing to a specified port number, or initiating 10-second interval auto-scanning. Belkin smartly has this switch ignore unused ports, save in manual selection, but there's no way to disable beep alerts. My keyboard's media function buttons also weren't recognized, and there are essentially no customization options.

My plague of poor microphone performance continued here. The F1DH104U exhibited a loud, high-pitched buzz that made understanding the speaker difficult, although audio playback was fine. I noticed some display ghosting on port 1 and determined this was the fault of the Belkin $55-plus, 6-foot, dual-display cable I had on that connection. Swapping cables fixed this, but note that the KVM switch doesn't include cabling. Populating all four ports will add at least $200 to your tab.

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

F1DH104U
$324.99
Belkin
www.belkin.com

HKS112AU
$59
Hawking Technology
www.hawkingtech.com



Switching time between ports was very fast, the unit is firmware upgradeable, the documentation is clear, and having dual-head support up to 2,048 x 1,536 per screen is pretty killer. Still, at this price point after cabling, I expected more features and configuration flexibility.

Hawking Technology HKS112AU

The HKS112AU is a no-frills KVM switch. A small control box feeds out into two sets of VGA/USB/audio cables. A VGA output port sits on one edge while stereo, mic, PS/2 mouse and keyboard, and blue/green LED switch buttons adorn the opposite edge. This is a good way to share out peripherals between two systems on the cheap.

I only hit one rough spot: The microphone performance was virtually nonfunctional. In playing back recordings, I could barely hear my own garbled voice. Stereo output was good, switching time was a speedy sub-two seconds, and I easily mastered the simple double-Scroll Lock handful of commands. The manual indicated a Scroll Lock-Scroll Lock-B command set to enable/disable beep confirmation when switching, but I could never get the beeps to turn on.

With a top resolution of 1,920 x 1,440 and no problem recognizing the extra function buttons on our separate USB peripherals, Hawking wins on low-end bang for the buck, assuming you don't use a microphone.

Iogear 2-Port Symphony KVM Switch

As the product photos suggest, Aten owns Iogear. So rather than go into the LED indicators and variables of how to bring over all or part of the switch's functionality, I'll just say it's nearly the same. You can customize auto-scanning duration up to 99 seconds (five is the default), and the beep disable feature worked.

There are some major differences from the Aten to note, though. The mic performance is much improved here; it's moderately hissy, but the clarity and fidelity of spoken recordings are quite acceptable. Stereo output was very good. This model only supports one 15-pin monitor, but it adds a three-port 10/100 Ethernet switch: one port to connect the router and two to share the connection between the systems. The GCS1772 shares Aten's text-entry hiccups in the few seconds after switching ports, but otherwise operation was smooth. Video quality was excellent, and all USB peripherals worked fine, including extra mouse and keyboard buttons.

The big question here is value. Is greater component switching flexibility, a mini-router, and a USB 2.0 hub with only two ports worth a $70 premium over a unit such as Raritan's 2-port USB SwitchMan or a $100-plus premium over Iogear's own Extreme 2-Port? In the right environment maybe, but given the low cost of those components, the price jump seems excessive.

Raritan SwitchMan SW4-USB

After seeing the Iogear, the SW4-USB is a very persuasive 1-to-4 alternative with its four USB peripheral ports, audio, all four cable sets, and many hotkey options for switching functions individually or en masse. Manual port switching was a bit different. By default, KVM/audio and USB are independent foci, and there are two buttons, one for KVM/audio and one for the USB hub. This is clever because if you don't need to share the same peripherals across all PCs, not moving the USB focus can save time and annoyance with PnP operations. Hotkeys let you bond all three foci together or separate KVM from audio so that pressing the PC button (or advancing to the next or previous port with

We connected our six KVM switches to four test rigs and proceeded to determine just how well they let us put our various sets of peripherals to work. The following is a glance at what you can expect each KVM unit to provide in terms of ports, size, cabling, and more.

Model	PC Ports	Keyboard & Mouse Input/Output	Max Resolution	USB Peripherals	Bundled Cables/Length	Dimensions (LxWxH inches)	Weight (pounds)
Aten CS-1744	4	USB/USB	2,048 x 1,536	2	Four sets/6 feet	10.2 x 3 x 1.7	2.3
Belkin F1DS104T *	4	PS/2/USB and PS/2	2,048 x 1,536	No	No	7.75 x 4.75 x 9.5	2
Belkin F1DH104U	4	USB/USB	2,048 x 1,536	2	No	7.75 x 4.75 x 9.5	2
Hawking HKS112AU	2	PS/2/USB	1,920 x 1,440	No	Two sets/6 feet	3.3 x 2.6 x 0.9	5.6 ounces
Iogear GCS1772	2	USB/USB	2,048 x 1,536	2	Two sets/6 feet	8.3 x 3.5 x 2.2	1.6
Raritan SW4-USB	4	USB/USB	2,048 x 1,536	4	Two sets/6 feet	9.25 x 5.5 x 1.7	2.3

* To read this review, go to www.cpumag.com/cpunov05/kvm.

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

KVM Switch (GCS1772)
$249.95
Iogear
www.iogear.com

SW4-USB
$219
Raritan
www.raritan.com

double-Scroll Lock commands) only moves the KVM function.

Stereo output was very good, but mic recordings picked up some buzz and slight distortion, but not enough to hinder regular use. The switch seems unnecessarily large after handling the Aten. A stand for vertical mounting is included, but Raritan's all-in-one cables were so stiff they kept pulling the switch off-balance. You can press Scroll Lock-Scroll Lock-Up/Down to advance to the next or prior port, but you can't press, say, 3 to jump from port 1 to port 3. Hotkey operations, including auto-scanning (in various increments), automatically skip unused ports, but manual button pressing won't skip these. My Logitech mouse's extra function buttons worked, but the wireless keyboard's didn't. Also, the package only includes two sets of cables.

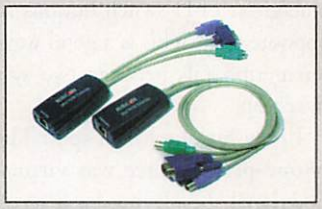
None of these are deal-breakers, though, and my overall experience was generally positive. The SW4-USB is firmware upgradeable; buzzer alerts are easy to toggle; the many configuration options are mastered with some practice; switching response is fast; and peripheral ports are USB 2.0. This is probably the best deal I saw in a 4-port unit for single-monitor setups. ▲

by William Van Winkle

For a bonus review and our "KVM Tips & Tricks" sidebar, subscribers can go to www.cpumag.com/cpunov05/kvm.

Go Long!

F1DS104T
$219.99
Belkin
www.belkin.com



With 6-foot cables being the norm, your KVM's reach can be fairly limited when trying to connect four or more stations. So, I looked at some CAT 5-based workarounds. KVM extenders typically are used in corporate spaces to place CPU boxes in secure or environmentally controlled environments, but applications with structured wiring in the home also have great potential. You'll need to pay close attention to the cable connections of KVM extenders, however, and make sure they match to your switch. The idea is to plug an extender into one of your switch ports, convert the signals into CAT 5 (Ethernet) cabling, and convert back out at the remote end. But if you can't plug in the cables, the whole concept flops.

Minicom's Mini KVM Extender ($199; www.minicom.com) uses two modules: a transmitter and receiver. The transmitter is an RJ-45 jack in an enclosure that feeds out to male 15-pin VGA and PS/2 mouse and keyboard plugs. This piece plugs into your PC. The receiver goes into your KVM and features another RJ-45 receptacle, an AC power port (adapter included), female 15-pin VGA, and female PS/2 ports (MiniDin6F). These devices' small size is a great plus, and there's no configuration to hassle with. The transmission range is rated up to 230 feet with standard CAT 5/6/7 cabling. The only hitch is that the PS/2-capable KVMs I had also used female plugs, so either PS/2 or USB adapters were necessary. For $199 it would have been nice for Minicom to include these.

Another alternative is Aten's CE-700 USB KVM Extender ($329.95), a pair of 15-pin VGA and USB mouse/keyboard converter boxes. Aten builds in a smart gain ASIC able to compensate for distances over CAT 5e cabling to reach up to 500 feet. The "remote unit" plugs into a KVM's console ports and features a VGA port and two USB ports for mouse and keyboard, as well as AC power (adapter included) and an RJ-45 jack. The "local unit" sports the same ports but adds two more: male VGA and a type B USB connector. This lets you control the CPU remotely through the KVM switch or locally from attached peripherals without having to unplug the Extender. The CE-700 supports up to 1,280 x 1,024 resolution and includes video/USB cabling for the local unit. ▲

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

ARCTIC COOLING

Distributed by Scythe

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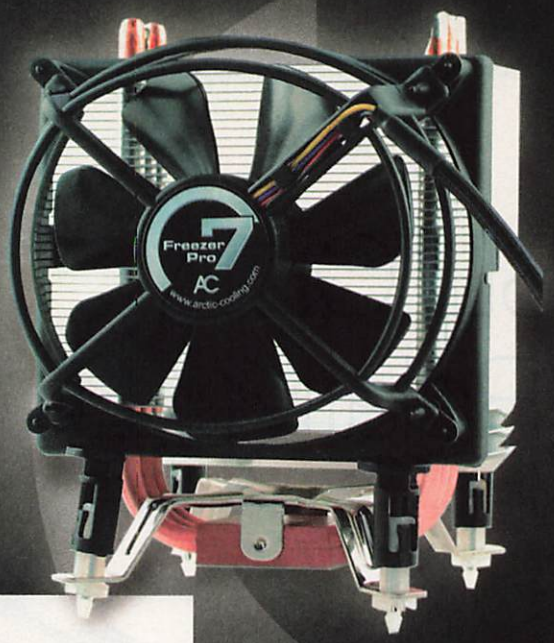

Main Features

High Cooling Performance

Freezer 7 Pro: 0.17°C/W
Intel Pentium 4 Box Cooler: 0.23°C/W
◂◂◂ Better

Freezer 64 Pro: 0.18°C/W
AMD Athlon 64 Box Cooler: 0.34°C/W
◂◂◂ Better

Extremely Quiet

Freezer 7 Pro: 0.9 Sone
Intel Pentium 4 Box Cooler: 4.9 Sone
◂◂◂ Better

Freezer 64 Pro: 0.8 Sone
AMD Athlon 64 Box Cooler: 2.6 Sone
◂◂◂ Better

Patented Fan Casing

Easy Installation

Integrated Cooling of Voltage Converters

6 Years Warranty

Freezer 7 Pro:
-all Pentium 4(socket 775)
-all Pentium D

Freezer 64 Pro:
-all Athlon 64 (FX)
-all Athlon X2

NV Silencer 5 (Rev.3)

The Cooler of ASUS EN7800GTX TOP Limited Edition-Fastest Graphic card on the Planet

Main Features

High Cooling Performance

NV Silencer 5 (Rev. 3): 0.42°C/W
Geforce 6800 Cooler: 0.63°C/W
◂◂◂ Better

Extremely Quiet

NV Silencer 5 (Rev. 3): 0.9 Sone
Geforce 6800 Cooler: 2.9 Sone
◂◂◂ Better

Enhanced Compatibility

ARCTIC Ceramic Bearing

DHES (Direct Heat Exhaust System)

Easy Installation

High Service Life

6 Years Warranty

COMPUTERBASE.de Preis Hammer *****

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CDRinf

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OverClock Intelligence Agency Approved

The 3rd Revision of the NV Silencer 5 is now compatible with both Geforce 6800 and 7800 series.

www.arctic-cooling.com

oxide.com
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DIRECTRON.COM Computer Super Store

SLI On A (Relative) Budget

How Do 40 Pixel Pipelines Sound?

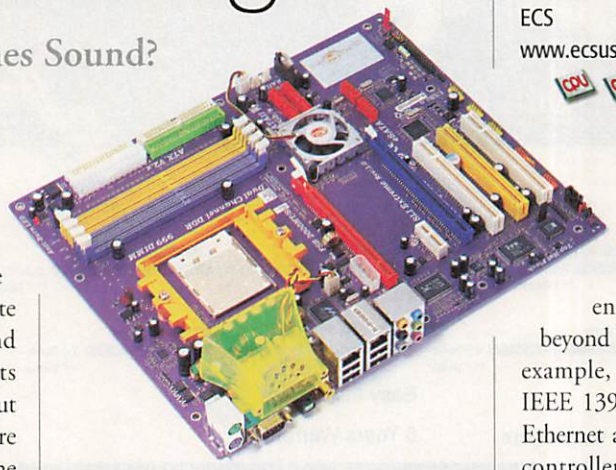
It turns out that there may be such a thing as too much power, or at least more power than your current games can utilize. Flagship video cards are very good at driving increasingly intricate graphics at astronomical resolutions and with all available visual enhancements turned on. But if your new LCD tops out at 1,600 x 1,200 or 1,920 x 1,200, there comes a point when the figurative volume knob maxes out, and you can't crank it any higher. Nvidia's technology pushes graphics hardware toward that point, and most games just don't tax the capabilities of two GeForce 7800 GTX cards on today's reasonably priced flat-screen panels.

Fortunately, SLI is no longer an exclusively enthusiast feature. Nvidia recently introduced a revised nForce4 chipset that can facilitate two x16 PCI Express slots, driving the previous dual x8 SLI solution into what representatives are calling the performance mainstream. The result is a new wave of budget-oriented motherboards with particularly high-end features.

Although most mainstream gamers would rather snag two GeForce 6800- or 6600-series cards, which sell for much less than they used to, the fresh GeForce 7800 GT is today's hotness. It's 20 pixel pipelines, seven vertex shading engines, and 400MHz (by default) of undulating silicon fury. Compared to the 7800 GTX, Nvidia's GT lacks four pipelines and a vertex shading engine. It's also $100 cheaper, with a suggested price around $399.

SLI On The Cheap

When the nForce4 SLI chipset first debuted, it wasn't that uncommon to find motherboards in excess of $200. As it stands we've devoted significant efforts to covering those higher-end boards (see April 2005's *CPU*, page 16, and October 2005's *CPU*, page 16, for respective coverage of AMD and Intel SLI platforms). Now it is time to look at the less glamorous side of SLI, specifically value-oriented products that trade a little functionality for a whole lot of green.



ECS KN1 SLI Extreme

How We Tested

In the best effort to prevent processor-limited performance, I used an Athlon 64 4800+ dual-core chip with the SLI motherboards. Corsair's dual-channel, low-latency TWINX kit laid a foundation for high-impact memory performance with a 1GB total capacity. Western Digital's 10,000rpm Raptor hard drive facilitated storage, and I ran all tests with integrated audio enabled. PC Power & Cooling's Turbo-Cool 510 served up the necessary juice to maintain stability. I ran Doom 3 using Ultra quality settings to best maximize workload. Similarly, I set Half-Life 2 and Far Cry to the highest visual settings. Half-Life 2 and Far Cry both controlled antialiasing and anisotropic filtering, while Nvidia's Detonator driver handled that duty in Doom.

ECS KN1 SLI Extreme

$120
ECS
www.ecsusa.com

Think it's hard to get excited about inexpensive hardware? Then check out the KN1 SLI Extreme. Although it sells for just above $100, there's a lot of enthusiast-level panache included beyond Nvidia's standard feature set. For example, 7.1-channel audio output and IEEE 1394a are bundled, along with dual Ethernet and an extra PCI Express storage controller. ECS goes beyond the call of duty on aesthetics by adorning its purple PCB with colorful ports and connectors. A translucent shroud towers over the board's power circuitry, exhausting air through a 40mm fan. Meanwhile, a series of four blue LEDs blink in an obscurely random manner. The lights are a bit tacky, like a Christmas strand that flickers without purpose, but the design is otherwise tasteful.

ECS' decision to put a two-slot space between the x16 PCI Express connectors is one of its best layout decisions. Asus is the only other manufacturer to add breathing room, which improves circulation between graphics cards and ultimately betters system stability. Even more exciting is the automatic SLI detection. Whereas most competing products require some sort of onboard connector or BIOS switch to establish dual-card operation, the KN1 SLI Extreme detects the appropriate operating mode without negatively affecting performance in any way. In fact, the board's overall alacrity is very impressive given its value designation.

ECS is making a concerted effort to change its mainstream image with flashier motherboards, and the KN1 SLI Extreme typifies that effort. Performance is great, the price is unquestionably attractive, and

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

the feature set reflects a premium pedigree. BIOS-enabled overclocking is a little light, and there are a handful of physical layout issues to note. For example, disengaging the PCI-E retention mechanism is nearly impossible without a screwdriver or butter knife. But overall, ECS has transcended its former self to manufacture an enthusiast motherboard truly worthy of consideration.

Foxconn WinFast NF4SK8AA

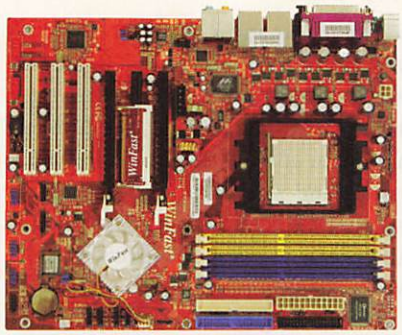
$120
Foxconn
www.foxconnchannel.com

Simplicity is almost always a welcome attribute in hardware if it massages price downward. Indeed, the WinFast NF4SK8AA is a relatively straightforward SLI motherboard. And it comes in at a very attractive price point, too. When you consider some of the comparably priced boards (many with heftier features), however, the NF4SK8AA falls a bit short.

It's not that there's anything inherently wrong with the card. Simply, nothing really sets it apart given its corresponding price point. To be fair, Foxconn does include dual GbE, a pair of IEEE 1394a ports, and an integrated 7.1-channel audio codec. A second SATA 3Gbps controller also extends the chipset's impressive capacity for storage.

The board is missing those few innovative extras that earn it accolades. Overclocking options are fairly meager, you still have to use the tired, old SLI selector card, which is already hard to remove, and minor layout gripes keep me from giving a wholehearted endorsement.

The NF4SK8AA's accompanying bundle is a bit light, as well. Bearing in mind that the nForce4 SLI chipset supports lots of storage and plenty of USB 2.0 connectivity, you'd expect the headers and cables to exploit those features. Unfortunately, there are only two SATA cables in the box. Also, only four of the 10 USB ports are accessible. If that weren't enough, while Foxconn's shipping BIOS revision ran fine, the latest version causes an error during every POST sequence, advising a processor



Foxconn WinFast NF4SK8AA

reset. At $90 to $100, the NF4SK8AA might be a highly compelling motherboard. But at $120 there's just not enough setting it apart from competitors.

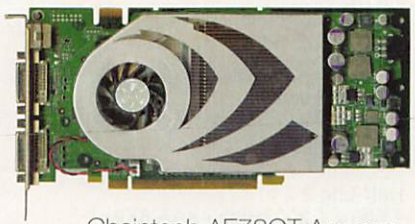
Power-Packed Graphics

The GeForce 7800 GTX is a smoking-fast card, and a pair yields no less than 48 pixel pipelines operating in sequence. But naturally the $500 price tag is enough to deter even remotely budget-conscious enthusiasts. It may (or may not) come as a consolation that the GeForce 7800 GT costs $100 less and sacrifices minimal performance. In fact, a single 7800 GT easily outpaces the previous generation 6800 Ultra.

Chaintech AE78GT Apogee

$399
Chaintech America
www.chaintechusa.com

In our first SLI graphics card roundup, we had some problems with Chaintech's mainstream GeForce 6600 GT card. Fortunately, the manufacturer has seemingly turned things around with its 7800 GT, delivering a solid design based on Nvidia's reference implementation. Clock speeds lock in at 400MHz for the core



Chaintech AE78GT Apogee

and 1GHz on the memory side in accordance with Nvidia's recommendation.

From a design perspective, every piece of the AE78GT is standard, from the heatsink to the dual DVI outputs to the HDTV output capability. That's a pretty common position on less expensive hardware, though, as manufacturers trade in flashy features for a more aggressive price. Chaintech does manage to set its board apart with a respectable software bundle consisting of Painkiller, the full 6-channel version of WinDVD 5, and an additional game bundle pack. Hardware accessories include an S-Video cable, an HD output pod, a DVI adapter, power cabling, and Chaintech's own tool kit.

Performance falls right where it should, rising only in the face of moderate overclocking. If you don't mind voiding Chaintech's meager one-year warranty, you might be surprised to achieve clock speeds of up to 475MHz on the 7800 GT core and in excess of 1.1GHz for memory.

Although the AE78GT boasts an impressive software bundle (big kudos for using the 6-channel version of WinDVD instead of the more common 2-channel edition), it offers less performance than the GT boards overclocked by default and at a comparable price point. Chaintech did an admirable job, but the AE78GT lacks the attitude to really shine through.

Leadtek WinFast PX7800 GT TDH

$399
Leadtek
www.leadtek.com

With a long heritage of specialty graphics products, Leadtek is almost expected to do something surprising with its newest cards. Last generation, it used massive copper coolers, resulting in some impressive overclocking results. This time around, its 7800 GT ships with nonstandard specifications. The G70 core runs at 450MHz, accompanied by 1.05GHz memory modules. Resulting benchmark scores favor the PX7800 GT compared to stock models.

Things only get better when you use Nvidia's Coolbits Registry tweak for overclocking. Our sample peaked at 485MHz

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

Leadtek WinFast PX7800 GT TDH

XFX PV-T70G-UDF7

and 1.11GHz for core and memory speeds, respectively. Just remember that tinkering with those settings is a sure way to nullify Leadtek's three-year warranty, which includes provisions for advanced replacement in the event of technical problems.

Leadtek's software bundle is one of the most impressive, with full versions of Prince of Persia: Warrior Within and Splinter Cell: Chaos Theory. You'll also find the MyVIVO suite, featuring DirectBurn and picture-in-picture support, along with PowerDVD 6, DVD MovieFactory 3 SE, and VideoStudio 8 SE. Hardware accessories include a component output dongle, S-Video in, S-Video out, two DVI adapters, and a power cable.

Given its adherence to suggested retail pricing, we're happy to see Leadtek add value through performance and software simultaneously. At stock speeds, the PX7800 GT TDH is an uncontested frame-rate champion. And at $400 you'd be hard-pressed to find a better card for use in an SLI configuration.

XFX PV-T70G-UDF7

$375

XFX

www.xfxforce.com

XFX is on a roll with the enthusiast crowd thanks to its recent slew of overclocked GeForce 7-series cards. If you were previously concerned about the longevity of a tweaked product, take solace in the company's Double Lifetime Warranty, a guarantee protecting your purchase (provided you register online) for as long as you own it. Should you throw the card up on eBay, whoever buys it can also register and receive protection with the program. With a warranty like that, there's little reason to sweat the effects of XFX's overclocking efforts.

Default frequencies on the PV-T70G-UDF7 run 450MHz/1.05GHz, like Leadtek's card. Although performance lags behind just slightly, real-world discrepancies are negligible. Mostly, you're going to see comparable numbers at stock and overclocked speeds, as the two boards hit similar ceilings. But the fact that XFX covers those elevated speeds with a lifetime warranty is much more confidence-inspiring.

It also helps that XFX gets serious with its bundle. A DVD copy of Far Cry, X2: The Threat, and moto GP2 come with every card. S-Video cables, a component dongle, DVI adapters, and a 6-pin power plug round out the package, which is dolled up in XFX's signature X-shaped box.

Price is the real kicker here, though. Even with a default overclock, lifetime warranty, and a couple of compelling games, you can buy the PV-T70G-UDF7 for $25 less than Nvidia's $399 MSRP. Although still pricey, XFX is selling what currently looks to be the best value in GeForce 7800 GT graphics cards. ▲

by Chris Angelini

SLI Motherboard Performance

Most Athlon 64-based platforms perform similarly thanks to the CPU's integrated memory controller. However, an immature BIOS can impede optimal throughput, as evidenced by the Foxconn NF4SK8AA's PCMark04 memory score. Updating to the latest revision only introduced stability issues instead of accelerating bandwidth figures. ECS' KN1 SLI, however, delivered solid operation and impressive performance numbers. Not bad for a $125 motherboard. (To see our SLI graphics cards performance chart, subscribers can go to www.cpumag.com/cpunov05/cards.)

Benchmarks	ECS KN1 SLI	Foxconn NF4SK8AA
Dr. DivX (845MB VOB, 1,000Kbps, one pass)	12:43	13:00
WinRAR (500MB folder)	3:26	3:49
PCMark04 Build 1.3.0	6792	6477
CPU Score	6793	6431
Memory Score	5428	4531
Graphics Score	8961	8861
HDD Score	3	3356
SYSmark 2004 (Overall Score)	262	248
Internet Content Creation (Overall Score)	325	305
3D Creation	293	276
2D Creation	381	356
Web Publication	307	290
Office Productivity (Overall Score)	211	201
Communication	188	186
Document Creation	252	239
Data Analysis	197	184
SPECviewperf 8		
3ds Max	20.53	20.75
CATIA	13.89	13.72
EnSight	14.74	14.59
Lightscape	12.19	11.68
Maya	24.93	24.91
Pro/Engineer	18.99	18.53
SolidWorks	16.95	16.76
Unigraphics	11.02	11.01
Half-Life 2		
1,600 x 1,200 (High 4XAA 8XAF)	96.79	81.43

CPU Ranking: 0 = Absolutely Worthless, 2.5 = Absolutely Average, 5 = Absolutely Perfect

Towers Of Power

Behemoth System Cases That Size Up

Once upon a time, you needed a pretty special reason for owning a power tower. Perhaps you needed the air flow for overclocking or drive capacity for operating a storage server. These days, the reasons for needing a large, high-performance tower are more ordinary. Many of us have amassed more hard drives than will fit in a minitower or desktop. Never mind overclocking, just running a fast CPU and dual graphics cards can turn your chassis interior into an equatorial hothouse. We also increasingly use oversized heatsinks, and really, who ever heard of showing off reactive UV gear in a desktop? If you want power, here are some of today's most promising towers put under the microscope.

AeroCool Masstige

Do you remember our review of Cooler Master's CM Stacker (August 2004 *CPU*, page 25)? AeroCool took that idea and downsized it. Like the Stacker, the Masstige (a blend of "massive capacity" and "prestige," according to AeroCool) can convert from ATX to BTX, features open-air grills on the 10 5.25-inch bays that comprise its front face, and provides a 120mm intake fan mounting you can reposition anywhere along the 5.25-inch bay stack.

AeroCool adds some coolness of its own, too. The PSU sits on the case's floor, and there's a large, steel mesh-covered vent under the PSU for ventilation. The rear plate is equipped to mount either one 120mm (included) or two 80mm case fans. Most interesting is AeroCool's toolless mounting for 5.25-inch drives. You simply slide the drive into the bay, press little plastic bars into the screw holes on each side of the drive, and turn a knob in the center of the bar to lock the drive in place.

AeroCool made a few mistakes, though. There are only two fixed 3.5-inch bays. These bays mount drives perpendicular to the motherboard and use toolless rails. However, the hard drive's front clicks into place a fraction of an inch from the left panel under the motherboard tray, and it doesn't take much pressure on the left panel to have it touch the drive. Only three 3.5- to 5.25-inch adapter rail sets are included, and a capacity of five hard drives in a 12-bay case seems a bit insufficient. I'm not overly fond of towers that put fascia I/O ports and Power/Reset buttons next to the floor. There's also nothing in the way of noise or vibration dampening, and the tacky, rainbow-reflecting AEROCOOL label across the front face *has* to go.

The Masstige is built solidly but with a few rough edges and little internal finesse. The right panel has a window under which mount three 80mm case fans in a row, but these are near and slightly below the level of the 120mm clear LED fan that AeroCool attaches on the rear panel. That's a lot of exhaust in a rather small area and seems more cosmetic than efficient. Ninety-nine bucks is pretty aggressive for a high-capacity midtower, but not an unbeatable deal vs. something like the Sonata II.

Antec P180

The P180 is the Escalade of PC cases. The outside is sleek, brushed aluminum accented with black plastic around the panel edges. Antec opted for a full-length door with a slight cut-away that reveals the key lock and 1394a, USB, and audio ports. Air vents run down each side of the door

Masstige
$99
Aerocool
www.aerocool.us

P180
$169
Antec
www.antec.com

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

for plenty of flow to the twin 120mm intakes on the front. Some reviewers have slammed the case's plastic door hinge as being a weak point, but the hinge's flexibility is intentional. Like eyeglasses with hinges designed to overextend outward and not break, Antec's hinge actually thwarts damage for those times when you accidentally kick the open door. Clever.

Two thumbscrews secure the left panel, which uses a triple-layer aluminum-on-plastic-on-aluminum design. Plastic has cheap, negative connotations, but I've never seen a smoother, more perfect-fitting panel than on the P180; it stays snug and releases with exactly the right amount of pressure, with plastic tabs sliding into the metal chassis. The same is true of the slide-out drive cages. It makes me want to never use another 100% aluminum or steel case.

The interior's bottom third—housing the PSU, 120mm fan, and a four-bay HDD cage—is walled off from the top section to thermally isolate the components, and it works brilliantly. You can add an optional 120mm fan between the drive cage and front face. A sliding panel secured by thumbscrews provides only as much room as is necessary for cabling to pass into the upper chamber.

This isn't a toolless case, nor is there a slide-out motherboard tray, but that doesn't bother me. Plastic drive rails are supplied for all 5.25-inch drives. The bottom and center pull-out 3.5-inch cages use soft rubber grommets for noise dampening, and the center cage features pull-out drive sleds, perhaps for easier swapping of backup drives.

The P180's two oversights are that there should be noise dampeners for the optical drives, and there's no 80mm fan included for the VGA duct. This is a flat chamber that mounts above your graphics card. The optional fan draws air up and vents it out the case's back. Because the rear vent is separate from the main duct chamber, sliding screw mounts let the fan intake move a few inches, so you can position it exactly right for your configuration.

The top and rear 120mm fans have built-in three-speed controllers. (Use the low setting if your system can control fan speeds.) The fans all have removable, washable filters. Antec throws in an attractive "spoiler" that snaps on above the top fan grill for extra protection, and extra screws and stand-offs store in a box attached to the center drive cage. The case is blissfully quiet, built like a tank, tasteful, ingenious, and genuinely fun to handle.

Cooler Master Praetorian 730

The Praetorian has a bit of CM Stacker in it and a lot of Wave Master. The fascia's hard edges and lines separate the case from the gentle flow of the Wave Master, but the Praetorian is just as beautiful, and arguably cooler, than its predecessor. The Power and Reset buttons in the top panel by the front are perfectly placed, and I prefer how Cooler Master stealths the I/O ports under a spring-loaded door in the top panel's center to any other manufacturer's design.

The all-aluminum chassis is impressive on the outside but surprisingly simple within. There are no rubberized doodads, rails, or toolless anything. The only removable piece is the slide-out motherboard tray. Two clear 80mm exhaust fans punctuate the rear panel, while a 120mm intake fan sits up front behind the HDD bays. Like the Stacker of old (and the AeroCool), the 730 uses all mesh-fronted external bay covers down the length of the fascia. However, there's no bottom or top venting, so pay attention to your air flow. Fortunately, Cooler Master adds a side-panel duct above the CPU. Also noteworthy is the special tooling and rings Cooler Master includes to make the case ready for watercooling, so you don't have to use a backplane slot.

This is a simple case that is short on conveniences or innovations but long on aesthetics and durability.

Praetorian 730
$149
Cooler Master
www.coolermaster.com

PC-73SLB
$219
Lian-Li
www.lian-li.com

Lian-Li PC-73SLB

More than two years ago, I reviewed Lian-Li's PC-6070 (September 2003 *CPU*, page 25), and in many ways the PC-73SLB (just "SL" for the silver version) is the 6070's big brother. They share many attributes, including similar slide-out HDD cages, fascia, front USB ports (still by the floor, grrr),

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

easily detachable aluminum door, sound-dampening pads on the panels, and a vibration-stopping rubber strip around the door's rim. The 73SLB's machining is even better, though, yielding better panel and cage sliding, and Lian-Li has replaced the old swiveling feet with locking casters.

Whereas the 6070 was a midtower, the 73SLB is a full tower, meaning it has a few changes for the better. The removable drive cage now holds six drives, all held tightly by rubber grommets. Above this are eight external drive bays. Two years on, the old 6070 gets a bit cramped when fully loaded (it's running on the floor in my office), but the 73SLB's extra real estate makes cable management far easier and much tidier. There's also more filtered venting in the 73SLB.

Two major departures from the 6070 are a PSU bay and add-in card bracing bar. Two 80mm case fans already come built in to the rear panel above the I/O ports, and the PSU fixing plate offers mountings for another two optional 80mm fans. However, there are three different fixing plates designed to accommodate redundant PSUs, which are essentially two PSUs stuck together, with one being a failsafe for the other. If you want to run the 73SLB as a server, this is a considerable feature. The bracing bar uses special thumbscrews to press plastic tabs onto the edges of your add-in cards to doubly secure them against jiggling during transportation. The bar mounts to the case with thumbscrews, making it easy to remove when you need to add or swap components.

As always, Lian-Li delivers another paragon of style, quality, flexibility, and robustness. The company hasn't messed with its successful formula, which is a good thing in most ways. If you can handle the price and aren't compelled to hop on BTX anytime soon, the 73SLB will serve well and grow with you for many years.

Thermaltake Kandalf (VA9000SWA)

Earlier this year, I took a look at Thermaltake's Armor tower (May 2005 *CPU*, page 30) with generally positive remarks. The Kandalf, as far as the eye and spec sheet can tell, is an Armor case with a new aluminum door. In some ways I like the new door better. The Armor case had two side flaps with a big gap running up the front panel's center. The Kandalf uses interlocking panels that, when closed, only reveal a deep circle lit mysteriously by blue LEDs (which is cool) and an illuminated Thermaltake logo running down the center (which is annoying). Fortunately, there's a switch inside to turn these lights off or make them flash. The door panels swing apart to reveal a tall line of mesh-covered bays.

Beyond that, everyone's entitled to change their minds a bit, yes? When I reviewed the Armor, I found the hinged, plastic clips that lock drives into the external bays cheap-feeling, and they are. But the clip's utility and ease of use have grown on me as other recent toolless approaches have shown their weaknesses. You can still move the front control panel to whichever bay you like, and there's still a three-drive 3.5-inch cage in the front that rests alongside a 120mm fan. Another 120mm fan is mounted in the real panel. Above this is a 90mm fan exhausting another (removable) three-drive 3.5-inch cage. I still like that the bottom bay is a storage drawer.

Kandalf (VA9000SWA)
$229.99
Thermaltake
www.thermaltake.com

My chief complaints about the Kandalf principally have to do with materials choices. After the Praetorian and Lian-Li, Thermaltake's windowed side panel and I/O compartment-wielding top panel feel immediately trashy because of their flimsy plastic. It's a full tower, after all. Another pound or two of aluminum won't kill anybody. But this is still a well-crafted case with great air flow, lots of expansion room, excellent toolless features, and only low-to-moderate noise thanks to larger case fans. The Kandalf is upgradeable to BTX, and Thermaltake's BTX kit is a straightforward affair to install, making it one of the most future-proof of any case I've seen yet. ▲

by William Van Winkle

Come On In & Take A Look Around

In the market for computer case real estate? You may just find what you're looking for in one of these towers or super-minis. Here's a look at the floor plans of the units we reviewed.

Case	Form Factor	Dimensions (HxDxW inches)	Weight (pounds)	Fans Included	5.25-inch Bays	3.5-inch Bays
AeroCool Masstige	ATX, BTX (option)	18.3 x 17.7 x 7.9	25	(3x) 80mm, (1x) 120mm	9/10 external	2 internal, 1 optional external
Antec P180	ATX	21.3 x 19.9 x 8.1	31	(3x) 120mm	4 external	1 external, 6 internal
Antec Sonata II	ATX	16.8 x 18.3 x 8.1	21	(1x) 120mm	3 external	2 external, 4 internal
Arctic Cooling Silentium T2	ATX	17.1 x 18.1 x 7.1	23	(4x) 80mm	2 external	2 external, 2 internal
Cooler Master Praetorian 730	ATX	18.2 x 21.3 x 8.9	22	(2x) 80mm, (1x) 120mm	4 external	2 external, 4 internal
Lian-Li PC-73SLB	E-ATX	25.4 x 24.5 x 8.3	21.5	(4x) 80mm	6 external	2 external, 6 internal
Thermaltake VA9000SWA	E-ATX, BTX (option)	20.9 x 22 x 8.7	40	(1x) 80mm, (2x) 120mm	10 external	2 external, 6 internal

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

Send In The Super-Minis

Sometimes a midsize case or larger is just a little too much. A case size becoming known as "super-minis" aims to provide most of the benefits of a midtower in a more compact size. I pitted two against each other to see how they, um, stacked up.

Antec Sonata II

After the superlative engineering of the P180, I felt a bit let down by the Sonata II. Don't misunderstand: This is a very good super-mini, outfitted with solid construction, rubber HDD grommets, and lots of drive bays. But there were some decisions made on this unit that left me wondering.

On the positive side, I remain enamored with Antec's signature piano-black finish, even though you need to keep a canister of surface wipes beside it. This case isn't a head-turner; it's designed to blend in (provided you disable the wickedly bright fascia LED). Antec smartly opts for a quiet, 120mm rear fan and provides several other fan mounts in the case. The Sonata II's price may seem steep until you realize it includes a very quiet Antec 450W SP-450 PSU ($80). Forget nifty drive rails and stealthy cable management. The Sonata II is built to be dependable, cool, nearly silent, and more budget-friendly. For instance, the double hinge design on the plastic fascia door is smart for preventing accidents, but the door itself feels unusually flimsy.

Part of the Sonata II's silent treatment is a massive duct apparatus that features optional fan mounts above the CPU and video card. In the P180 a duct made sense. Here, it's so bulky that it obscures over half of the 120mm fan grill as you look in from the back. The SP-450 isn't an SLI-approved PSU, and I question why provide for so much GPU cooling in a mainstream case? Other Antec models, such as the Overture, simply put a side panel vent right over the CPU. This would have been a much better choice for the Sonata II. As it is, there's no panel venting at all.

This is a good, versatile mainstream case, but Antec needs to decide what this Sonata wants to be when it grows up.

Arctic Cooling Silentium T2

Our other super-mini is an exercise in unconventional thinking. Arctic Cooling is famous for its excellent, extremely quiet fans, and the T2 employs four of them. Two sit together where the PSU would normally go, and the other two mount on and above the preinstalled 350W Seasonic SS-350ATC PSU, which exhausts through the floor and is positioned where most manufacturers put their drive cage.

Attached to the side of the PSU is the T2's greatest oddity: a thick aluminum shell that snugly fits around a hard drive and is held suspended to its mounting by a thick rubber band at each corner. You guessed it. There's zero chance of chassis vibration from your hard drive. The shell muffles virtually all drive noise and acts as a HDD heatsink to boot. The problem is that you can only mount one drive this way, so let's hope you're not running a RAID. Also, there's a plastic panel at each end of the drive shell that uses a clip at each corner to stay in place. One of these clips snapped off as I was trying to remove a panel, and I lost one of the rubber bands because they're not permanently attached to the mount arms.

Novelty prevails elsewhere, too. The easiest way to mount 5.25-inch drives is to remove the entire front face—normally a difficult task but simple here through being secured by just three plastic clips. All drives mount with toolless rails, Arctic throws in some rubber rings for dampening vibration in other drives, and add-in cards secure with a swinging, toolless bar rather than screws. Intake and exhaust grills on the bottom don't have dust filters, but Arctic Cooling requires you to use the included base, which lifts the case an inch or so off the floor and allows air in and out.

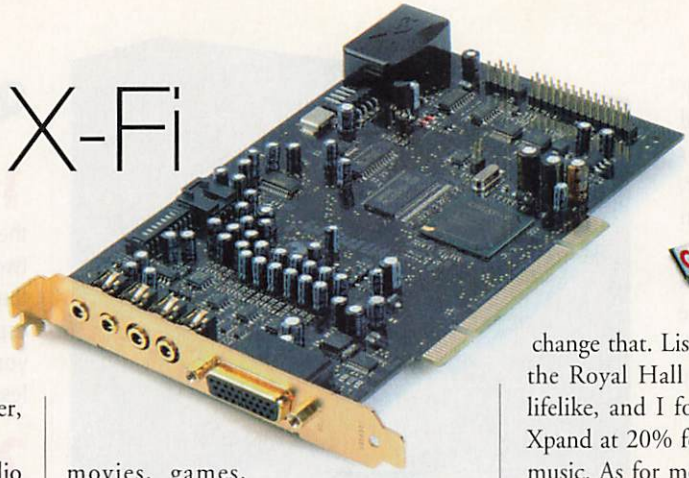
Although the fascia is plastic, the T2 is an attractive case and very sturdy. Arctic's unique airflow design works well and helps contribute to the unit's low noise—the lowest I've probably seen in any nonfanless chassis design. Seasonic's PSU is a high-efficiency model and copes terrifically with most any single-GPU configuration, although it has been adapted to this case and can't be upgraded. The T2 may not have the capacity of Antec's Sonata II, but it wins on quiet and innovation. ▲

Sonata II
$129.95
Antec
www.antec.com

Silentium T2
$129
Artic Cooling
www.arctic-cooling.com

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

Creative X-Fi



X-Fi Fatal1ty FPS
$279.99
Creative
www.creative.com

Creative's new X-Fi (Xtreme Fidelity) line of PCI sound cards is being billed as the most revolutionary jump in PC audio since the Sound Blaster Live! On paper, that's surely true.

The X-Fi chip is a huge leap in audio processing power, with 51.1 million transistors and a processing speed of 400MHz. A large portion of X-Fi's resources are dedicated to SRC, which previously introduced significant distortion into the signal; however, X-Fi now makes this process essentially distortion-free and lossless.

Traditional sound card chips process linearly through multiple modules. The X-Fi uses an Audio Ring architecture in which each module sits on a bi-directional spoke around a hub, allowing 4,096 communication channels so that any module can talk to any other module simultaneously. This is part of why the X-Fi can play 127 simultaneous voices and do so with barely any additional CPU utilization.

Music To The Ears

I tested X-Fi with a 3.6GHz Pentium 4 on an Intel D925XCV motherboard with HD Audio (Realtek ALC860), 1.5GB of RAM, Windows MCE 2005, Logitech's Z-5500 5.1 THX speakers, and Sony MDR-V6 headphones. I planted the X-Fi Fatal1ty FPS next to an Audigy 2 ZS on my last two PCI slots, alternately disabling one or the other for closer side-by-side comparison, and cycled through movies, games, DVD-Audio, and MP3s.

Upshot. The X-Fi is a dramatic improvement over the Audigy 2 ZS, particularly if you have the right speaker hardware. Predictably, I heard a wider performance gap between the two cards on my Sony reference headphones than Sennheiser's PC 160 headset. Similarly, I suspect that the X-Fi would have yielded even better bass response on Logitech Z-680s than the 5500s owing to the latter's mushier lows.

With no enhancements enabled, the X-Fi yields much fuller sound through the mids and considerably brighter and clearer highs. The difference was appreciable in music, particularly MP3s at moderate (160-plus Kbps) bit rates. When I loaded Doom 3 with the X-Fi patch, though, the difference was startling. Surround directionalism is more precise, the details far sharper and more numerous, the fidelity wider. Detail clarity improved even more when I enabled X-Fi's SVM (Smart Volume Management), which uses volume leveling to make quiet sounds more audible.

Until now, I have never found a single upmixing or simulated environment scheme that wasn't inferior to the original audio. X-Fi's EAX 5.0 and CMSS-3D change that. Listening to Aerosmith with the Royal Hall effect sounds darn near lifelike, and I found myself using Stereo Xpand at 20% for nearly all of my studio music. As for movies, I haven't heard the lobby shooting spree from "The Matrix" sound so gut-wrenching since seeing it in the theater.

Caveats. Along with EAX and CMSS-3D, Creative provides a tool called Crystalizer designed to help fill in the fidelity lost to compression and 16-bit recording. On some content it works; on some it doesn't. Use Crystalizer with EAX and/or CMSS-3D, and the end result is an overcharged, distorted mess. Strangely, X-Fi's DVD-Audio sounds similar to the Audigy 2. My biggest gripe with the X-Fi is that it's so rich and so adept at enhancements that I found myself constantly having to retweak settings every time I switched media or even albums. The much-improved Creative UI needs global presets, not just EQ presets, to accommodate this. Lastly, no matter what schemes or settings I tried, headphone-based movie listening was disappointing, save only when played in bare stereo. Dolby Headphone and all the rest only served to blur and deaden the X-Fi's subtleties.

Worth It?

That depends. As I said, you need speakers or headphones able to reveal the

A Comparison

	Raw Data Path MIPs	Typical Processor MIPs	Internal Audio Channels Available	Overall Audio Sample Rate and Effects Processing MIPS vs. Live!	No. of Simultaneous Real-time Effects	No. of Transistors
Sound Blaster Pro	1 (approx.)	3+	N/A	0.0001x	N/A	100K
AWE 32 (EMU8000)	67	200+	N/A	0.2x	N/A	500K
Live! (10k1)	335	1,000+	16 (to Effects Engine)	1x	1	2M
Audigy (10k2)	424	1,250+	64 (to Effects Engine)	4x	4	4.6M
Creative X-Fi	10340	30,000+	4,096	67x	8	51.1M

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

X-Fi's potential. Second, while Battlefield 2 and Doom 3 are optimized for X-Fi, most games aren't, and market adoption takes time.

Third, consider which X-Fi package makes the most sense. The $129 X-Fi XtremeMusic is essentially the bare card with base software. Most users will find this sufficient. The X-Fi Platinum ($199.99) adds an IR remote and a 5.25-inch bay device with audio ports. The X-Fi Fatal1ty FPS ($279.99) tacks on 64MB of X-RAM and a red-lit Fatal1ty logo. The X-Fi Elite Pro ($399.99) uses higher-grade components to enable a 116dB SNR vs. 109dB on the other models, an external breakout box, and beefed-up electronics for recording and instruments. Overall, the XtremeMusic and Elite Pro make the most sense, at least until price settling makes that extra memory more palatable.

On paper, the X-Fi is a revolution. In practice, it's a bit less but still drastically better than any integrated audio, both in sound quality and system resources, and a worthy step up from the Audigy line. ▲

by William Van Winkle

Quick Tips

1 In Entertainment Mode, you'll find bass and treble knobs to the right of the big volume knob. Adjust these before tweaking the 10-band equalizer. I found that fiddling with EQ caused distortion, especially in high bit rate content, but if you adjust the bass and treble knobs first, less EQ work is needed.

2 If you like your headphone music with 3D psychoacoustics, use the what-you-hear recording option in the MediaSource player while in headphone mode, and with CMSS-3D turned on, re-record your MP3 files to create expanded copies for use on the road. You'll get the 3D effect without needing 3D decoding built into your player.

3 Feed your satellite or cable set-top's stereo audio outputs through the X-Fi in Entertainment Mode. If you've got 5.1 (or more) speakers, CMSS-3D rocks for sporting events and music videos.

OCZ PC-3500 Gold Gamer eXtreme

With its PC-3500 GX modules, OCZ has selected modules that are comfortable at 2-2-2-5 timings, 2.8V VDIMM, and a 217MHz bus frequency (DDR433). For a pair of 512MB modules, GX will cost about $55 more than standard 3-3-3-8 DDR400 fare, but it's worth it if your apps demand strong memory performance and you want minimum BIOS tweaking time.

I put the GXes on an MSI K8N Neo4 SLI board alongside an Athlon 64 4000+ processor and compared them against Corsair's equivalent timing SKU, a pair of 2-2-2-5 CMX512-3200XL modules. Memory voltage was set to 2.8V, timings set manually, and BIOS options at default. As you can see, OCZ's GX wins in four out of five tests, only losing in PCMark- 04's memory test. Both configs failed at 217MHz in 3DMark05, likely because of CPU limitations, but it's interesting that the 217MHz settings failed in Doom 3 with Corsair while OCZ ran fine. OCZ's advantage in Half-Life 2 and Sandra at 217MHz is also remarkable. But, Corsair rates these as PC 3200, not PC 3500, so this comparison shows the difference among speed bins, not brands or models.

Priced well for their performance, stable, and under lifetime warranty up to 3V, OCZ's GX memory is a good choice for moderate overclockers. ▲

by William Van Winkle

PC-3500 Gold Gamer eXtreme (2 x 512MB kit)
$179
OCZ Technology
www.ocztechnology.com

CPU CPU CPU CPU

Specs: Unbuffered; Heatspreader: gold on copper; Timings: CL2-2-2-5; Rated bus speed: 217MHz; Rated VDIMM: 2.8V (warranteed up to 3.1V)

OCZ GX Memory Tests

Manufacturer	Model	Bus Speed	Sandra 2005 Memory (avg.)	PCMark04 Memory	3DMark05 (default)	Half-Life 2 at 8x6	Doom 3 at 8x6 high
OCZ	OCZ4331024ELDCGEGX-K	200	4932	4903	6118	91.37	114.7
OCZ	OCZ4331024ELDCGEGX-K	217	6021	5251	Game 1 fails	110.65	123
Corsair	2 x CMX512-3200XL	200	4957	4905	6114	91.84	114.7
Corsair	2 x CMX512-3200XL	217	5352	5258	Game 3 fails	98.91	Cancels out

CPU Ranking: 0 = Absolutely Worthless ... 2.5 = Absolutely Average ... 5 = Absolutely Perfect

ATI All-In-Wonder X800 XL

All-In-Wonder X800 XL
$399
ATI
(905) 882-2600
www.ati.com

The All-In-Wonder X800 XL is everything you could want from a functional card. It occupies one slot, gets enough power from the PCI Express bus to skate by without an auxiliary connector, and it's trimmed in gold.

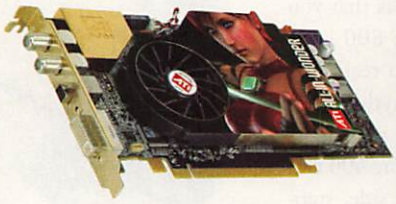
The board's more than just sexy. Connectivity and features are its real fortes. The R430 graphics processor wields 16 parallel pixel pipelines running at 400MHz.

European users get DVB-T digital tuning, while North American folks are relegated to analog . Although that's a disappointment to early adopters of digital and HDTV, the onboard Microtune 2121 tuner improves quality and accelerates those slow channel changes that plagued the AIW X800 XT.

New Multimedia Center software polishes rough edges from previous releases, while a new Remote Wonder Plus replaces the Remote Wonder II.

At $399, the All-In-Wonder X800 XL is actually a reasonable buy if you're still tuning in to an analog broadcast. If not, the board boasts a load of connectivity features, including dual monitor support with DVI, FM tuning, component output, and video input. ▲

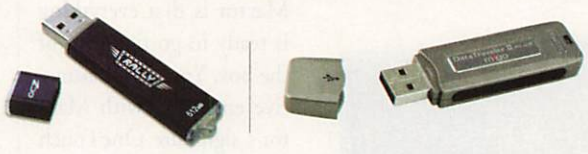
by Chris Angelini



	ATI AIW X800 XL 256MB	ATI Radeon X850 XT PE 256MB
Doom 3		
1,024 x 768	83fps	96.7fps
1,600 x 1,200 4xAA 8xAF	28.7fps	36.7fps
Far Cry		
1,024 x 768	94.74fps	97.43fps
1,600 x 1,200 4xAA 8xAF	43.1fps	54.05fps
3DMark05	5061	6419

Specs: R430 GPU; 400MHz core; 490MHz memory; 16 pipelines; silicon tuner; Remote Wonder Plus; DVD burning; FM radio; PVR

Kingston DataTraveler II+ Migo Edition vs. OCZ Rally



Rally
$159
OCZ Technology
(408) 733-8400
www.ocztechnology.com

DataTraveler II+ Migo Edition
$80
Kingston Technology
(877) 546-4786
www.kingston.com

When it comes to storage on the go, you can't beat the flexibility of a USB flash drive. And, as capacities continue rising, form factors continue to shrink. For example OCZ's Rally, which is bathed in a black aluminum chassis, incredibly diminutive, and a purported speed demon.

The Rally uses dual-channel technology, and OCZ doesn't try to claim unrealistic performance improvements (23MBps read and 17MBps write speeds). A lifetime warranty further extends the Rally's value.

Kingston's DataTraveler II+ Migo Edition comes close with a five-year warranty. However, the drive's hallmark feature isn't its guarantee. Migo's bundled synchronization software is instead the focus, enabling a quick and easy mechanism for keeping documents and email organized among multiple PCs. It can duplicate your Desktop and inbox on a secondary system, but make sure you have the same apps installed on both.

It isn't easy to pick between the OCZ and Kingston drives. The Migo functionality is awesome if you're switching among systems. Performance isn't the drive's strongest suit, but when you compare it to OCZ's supposed pocket rocket, Kingston fares well. Conversely, the Rally is a quick and sexy little product. It's definitely faster than competing products and not much more expensive than comparable drives. Given the lifetime warranty, I wouldn't hesitate to buy the Rally, either. ▲

by Chris Angelini

	Rally	DataTraveler II+ Migo Edition
SiSoft Sandra 2005 Combined Index (operations per minute)	1206opm	1250opm
Endurance Factor	8.7	18.5
2MB Files Test	331opm	257opm
64MB Files Test	16opm	16opm
500MB Sm. File Write Test (minutes:seconds)	9:07	9:17
500MB Sm. File Read Test	1:15	1:19
648MB Lg. File Write Test (seconds)	38	45
648MB Lg. File Read Test	35	41

Specs: (Rally) 2GB; rated reads at 23MBps and writes at 17MBps; lifetime warranty; aluminum chassis (DataTraveler II+ Migo Edition) 1GB; rated reads at 19MBps and writes at 13MBps; 5-year warranty; Migo and SecureTraveler software

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

OneTouch II 200GB FireWire 800 And USB Drive
$229
Maxtor
(408) 894-5000
www.maxtor.com

External Serial Storage

Maxtor OneTouch II 20GB FireWire 800 & Sonnet Fusion 400

Fusion 400 4-Bay eSATA Hot-Swap Drive Enclosure
$599
Sonnet Technologies
(949) 587-3500
www.sonnettech.com

More so now than before, serial storage technologies are displacing their parallel predecessors. SAS and SATA currently claim most headlines, but did you know that FireWire and USB are serial interfaces, as well? Although those two are the traditional champions of external storage, eSATA is now threatening USB 2.0 and FireWire 800 with speeds of up to 3Gbps.

It's no secret that the 7,200rpm hard drives found in most external enclosures don't come close to approaching SATA's new 3Gbps ceiling, though. Is there any reason to take the eSATA route then, when plenty of other USB and FireWire drives already deliver the goods effectively? That depends on how highly you value performance. Maxtor's 200GB FireWire 800 drive is fast. HDTach shows burst speeds of 86MBps, sustained reads of 54MBps, and file transfer rates that resemble internal speeds.

Then again, Sonnet's eSATA enclosure with a single Seagate 400GB Barracuda 7200.8 turns in better scores. When the Maxtor drive bursts near the theoretical limits of its FireWire interface, native SATA enables a bit more headroom, letting the Barracuda hit 135MBps. Sustained gains are more subdued as averages hover in the 58MBps range. You may never notice the difference, though, unless you time your 10GB file transfer with a stopwatch. Although it posts better write performance in a real-world copy operation, the eSATA concept lags a bit moving data in the other direction.

The obvious caveat to Maxtor's offering is that you need a FireWire 800 controller in order to realize its full potential. Anything less and you may as well have bought the FireWire 400 version. On the flip side, stepping up to Maxtor's 300GB model buys you an extra 8MB of data cache. (The 200GB model has 8MB; the 300GB has 16MB.)

Perhaps the best reason to go with Maxtor is that everything is ready to go right out of the box. You get an attractive enclosure with Maxtor's signature OneTouch blue LED button. The drive is already installed, and all of the interfaces are complemented with bundled cables. And, Maxtor includes a copy of EMC Dantz's Retrospect Express. The software is easy to use and powerful (not quite to the degree of Retrospect 7 Professional, but more than sufficient for any home or small business user to back up a local PC).

In all fairness, Sonnet's Fusion 400 isn't designed to be an inclusive package or go head-to-head against SOHO equipment. It's a barebones enclosure with the flexibility to accommodate a custom SATA hard drive array. Priced right under $600, there's no denying that Sonnet's Fusion attracts a different type of power user than Maxtor's OneTouch II. Nevertheless, business-class features, such as hot-swappable drives, an integrated power supply, and a tiny footprint, warrant the cost. Sure, you have to populate the thing, and yeah, you need four free SATA ports to connect all of the drives, but in the SATA world, this is as fast as it gets.

There's a good chance that USB and FireWire drives will start fading as eSATA proliferates. The SATA-IO also has xSATA and ClickConnect on the table, promising to extend cable lengths to 8 meters and add an Ethernet-like retention mechanism to SATA cables. Eventually, we'll start seeing external SATA storage come down in price, too, offering the same performance you get from an internal drive. ▲

by Chris Angelini

	OneTouch II	Fusion 400
HD Tach		
Burst Speed	86.3MBps	135.5MBps
Random Access	16.4ms	15.8ms
Average Read	53.9MBps	58.5MBps
SiSoft Sandra 2005		
File System Benchmark	52MBps	58MBps
9.72GB File Write (minutes: seconds)	3:35	3:24
9.72GB File Read	3:26	3:30

Specs: (OneTouch II) 200GB; 7,200rpm; 8MB data cache; 9ms seek; FireWire 800 rated transfer: 64MBps; FireWire 400 rated transfer: 42MBps; USB 2.0 rated transfer: 34MBps (Fusion) Four hot-swap drives; SATA 1.5Gbps and 3Gbps compliant; built-in power supply; bundled eSATA enclosures rated for 5,000 insertions

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

ATI's Avivo: Ready For HD-DVD/Blu-ray

by Anand Lal Shimpi

The Viiv trend—grouping a bunch of your products together, calling it a platform, and reaping huge monetary rewards—is in. Of course, as much as we all love to vilify marketing, there have been some definite benefits from this platform-minded approach to computing kicked off by Intel's Centrino.

The incredible amount of marketing dollars behind Centrino, in combination with its very power-optimized architecture, has led to thinner, faster, and more power-efficient notebooks. Centrino has also brought us a plethora of wireless-equipped notebooks and wireless access points since its introduction two years ago. Obviously, not all of that can be accredited to Intel, but a significant portion of it can.

It was only a matter of time before other manufacturers began to follow suit, and thus it wasn't much of a surprise when AMD announced its first mobile platform, the Turion 64. Because not everyone has the resources that Intel does, the Turion platform was less of a brand-new architecture and more a repackaging of current technologies that AMD had at the time. But the premise was similar; if you walk into a store and ask for a Turion, AMD guarantees a certain level of minimum features you can expect from the overall platform.

Well, ATI has done the same thing, and this time with video. Intel's commitment to the Viiv platform shows that PC manufacturers are really taking the media PC seriously, and the latest shipment numbers tend to agree. On average, PCs equipped with Windows XP Media Center Edition have made up less than 20% of retail desktop sales, but thanks to some aggressive marketing and price cuts by OEMs, that number has been quickly approaching the 50% mark.

The price is now right, and consumers are clearly buying into the idea of a media center PC, but now who is going to be there to ensure that you get the best overall quality? Intel's Viiv initiative does some of the work, defining a list of hardware and software necessary to make what it deems an acceptable home media PC, but ATI is taking that one step further with its first platform initiative: Avivo.

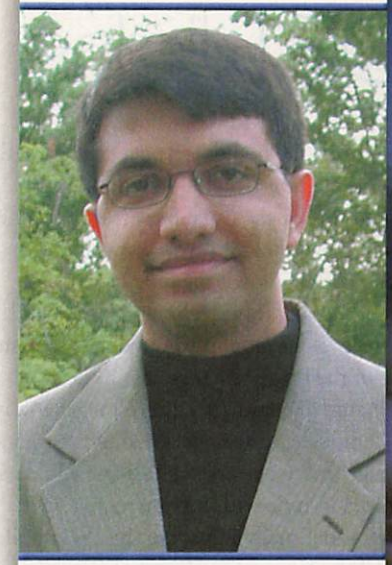
The Avivo platform essentially consists of two hardware products and their associated software. First off, you must get video onto your PC, and ATI defines a minimum quality level that must be maintained while doing so. The Avivo-enabled TV tuner/capture card that is suited for this job is ATI's Theater 550, the company's highest-end TV tuner card. In this sense, Avivo doesn't actually bring anything new to the table.

The second piece of hardware that comprises the Avivo platform is ATI's latest R5xx class of GPUs. Thanks to the architecture of these new processors, Avivo can offer users GPU-assisted H.264 decoding and transcoding, significantly reducing CPU utilization when performing either of those tasks. The decode/transcode support actually extends beyond just H.264 to formats like MPEG-2, MPEG-4, DivX (transcode only), and WMV9, but the key focus is on H.264. Hardware-assisted H.264 decode and transcode support is important because those are the formats that most next-generation movies will be stored in; H.264 is a part of both the HD-DVD and Blu-ray specs and is widely expected to be to those standards what MPEG-2 was for DVD.

Even the fastest CPUs end up using close to 100% of their time decoding an H.264 stream; with the decode assist offered by any Avivo platform, that number drops to around 30%. Although it's not a full reduction in CPU utilization, it is very significant. By the time HD-DVD and Blu-ray roll around next year, you won't want to be using a PC without some sort of H.264 decode acceleration.

The transcode acceleration support is also useful, as it means that converting your existing movies into higher compression/quality formats such as H.264 will be even faster, and also eat up less of your CPU time than they currently do.

Avivo's final guarantee is better overall image quality, regardless of your display type. While I'm still waiting to try actual hardware to measure the amount of improvement, the building blocks are all there to make Avivo a winner. ▲



Anand Lal Shimpi has turned a fledgling personal page on GeoCities.com into one of the world's most visited and trusted PC hardware sites. Anand started his site in 1997 at just 14 years old and has since been featured in USA Today, CBS' 48 Hours and Fortune. His site—www.anandtech.com—receives more than 55 million page views and is read by more than 2 million readers per month.

Avivo's final guarantee is better overall image quality, regardless of your display type.

Talk back to Anand@cpumag.com.

IDF Highs

by Alex "Sharky" Ross

Disrupting Reuters' newswire with a cheery Christmas greeting at age six, Alex "Sharky" Ross became an avid computer user/abuser, eventually founding popular hardware testing/review Web site SharkyExtreme.com. Exposing shoddy manufacturing practices and rubbish-spouting marketing weasels while championing innovative products, illuminating new technology, and pioneering real-world testing methods was just a front for playing with the best toys. The site acquired, he left in 2001. A London native and London School of Economics graduate, Alex currently overclocks/tunes Porsche 996 Turbos with www.sharkwerks.com when he's not tweaking PCs.

Despite the higher attendee numbers, this year's IDF (Intel Developer Forum) seemed to lack the usual buzz from previous shows. Nevertheless, if you want to know what's coming down the pike in terms of microprocessors and technology, the Fall IDF is usually a decent glimpse at what's to come. One of the biggest changes has to be Intel finally moving away from the "megahertz is king" model and simply cranking the frequency to get more performance. Its new line will be more in tune with megahertz per watt, which is definitely important on the mobile side of the fence where battery life is key and on the enterprise/server side where reduced power consumption equates to less fatty bills.

Intel also stressed its focus upon multicore processors when improving performance and continues to go forward in that regard, even if software is somewhat slow to catch up. (As the saying goes, "If you build it, they will come.") On the desktop side, Intel's next-generation microprocessor was not yet given a name (although its code name is Conroe), but the company did show off some slides to indicate that the processor will still be based on the 64-bit Pentium 4 NetBurst architecture and encompass the power-saving benefits of the Pentium M. The core will be wider and sport a four-issue decode, execute and retire with deeper buffers, and a 14-stage integer pipeline, which Intel claims will be far more efficient and save power over the deeper 31-stage Prescott core. Apparently there will be improved memory access with improved memory prefetch and memory disambiguation.

In addition, this architecture will be based on an even smaller 65nm process. Also new will be the "Multicore Enhanced Cache System," which is actually somewhat similar to the Yonah platform with a shared and scalable L2 cache. Cache-to-cache performance will be targeted with a direct L1-to-L1 and L1-to-L2 cache-transfer system, as well as new speculative data loads. Somewhat impressively, the dual-core Conroe models will have a 65W target for TDP. Right now, however, there's little to get excited about in terms of performance numbers because there weren't any frequencies announced. Although clock speed didn't seem all that important to Intel, it could still give some level of indication in terms of performance. (A demo system was displayed running a 64-bit version of Linux.) A much more exciting demo (although there wasn't any real indication of where this project was going) was Intel's on-die memory and graphics controller hub (northbridge) Pentium M. Along with an on-die CMOS voltage regulator, this was the kind of thing I hoped to see more from Intel and certainly something that would nip at the heels of AMD's performance advantage gained with its on-die memory controller. Seeing a working demo meant that should Intel wish to release technology such as this to the gamer segment, it could. But will Intel do it?

Intel Developer Forum

For the mobile sector, Intel will also be releasing a dual-core processor dubbed Merom in late 2006, which will target battery life and finally bring dual-core to that sector.

Expect to see Intel roll out the Conroe-based CPUs by the second half of 2006. Also, there will still be a couple of new single-core processors based on that same 65nm process on the horizon (somewhat quietly, though). And, speaking of quiet, there were already mumblings about Intel working on quad-core processors.

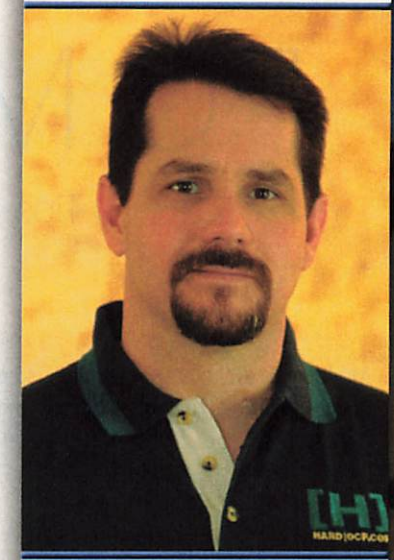
Another push from the big "I" is its new Viiv brand, which is part of the company's new digital home initiative. All the new 65nm processors will sport the logo, and Viiv PCs will come with a remote control to work with Windows XP Media Center Edition and Intel Quick Resume Technology (letting your machine turn on and off instantly). Certainly expect a lot of Intel-based SFF machines to be out there thanks to a push and shove from Intel. ▲

If you want to know what's coming down the pike in terms of microprocessors and technology, the Fall IDF is usually a decent glimpse at what's to come.

Email me at sharky@cpumag.com

Editors & Benchmarks Suck '05, Part II

by Kyle Bennett



Ah, Part II of my very own version of "How to Win Friends & Influence People" is upon me. I say this because I'm sure some of my peers aren't happy with what I've said here lately (see the October 2005 *CPU*, page 30, for Part I of this column), but they are things that needed to be said. Last month, I griped about what's wrong with our computer hardware review industry. In a nutshell, we have a bunch of editors who still focus on flawed benchmarks or ones with no value. What you get is a hardware "review" that gives advice on a product that was in no way, shape, or form evaluated in any manner close to how you will use it. Now, let's turn the focus to what needs to be done to bring more balance and credibility to "hardware reviews."

First, I want to focus on HardOCP's 3D video card reviews, for which we primarily focus on gaming. We stopped calling these "reviews" a couple of years ago and started referring to them as "evaluations." More to the point, we stopped "reviewing" video cards. I looked at the reviews we were supplying readers and concluded that the information wasn't really answering their questions about video cards, namely, which video card is going to be "the best?" When you break that down, the reader isn't asking which card will give him the best benchmark score. He's really asking which video card will give him the best user experience. And while there's an entire community out there that's very concerned with video card specs and specific technical scores, the majority simply wants to know which card will give them a good gaming experience. Looking at our benchmarks, I wondered if the data really told the reader what he needed to know. I don't think we were making bad recommendations, but I also don't think we were really basing them on data that's important to the guy who would be using the card. It was then that I pitched all our video card benchmarks in the trash. This upset a lot of folks, but damn the torpedoes and full speed ahead.

From that point on, we started using real gameplay to evaluate video cards—no more benchmarks. We didn't focus on the card, but rather the gaming experience the card delivered. After all, that's what's important to most folks. So, we started playing the most popular games on the video cards and putting together evaluation systems that let us compare that real-world gameplay. Frankly, I think the process has given us the best user-focused video card reviews in the world.

But is a user's experience limited to just how the product works? When it comes to computer hardware, I'd argue that there should be a lot of discussion about how it did not work. For example, how well did the product manufacturer respond when there was an issue? In a world where products are becoming more alike all the time, what exactly is becoming more important as products move toward being a commodity? If you said "service and support," we would be like-minded. That's why we started calling company support lines at 11 p.m. on a Friday night. Is there someone there to solve the problem? Heck, is there even a number to call? Can you get an RMA to a location in the United States? These are very real issues that need to be looked into. Now when we talk about a video card being a good buy, we certainly take service, support, and warranty into consideration.

HardOCP is also expanding into prebuilt computer evaluations. Our first few are online. These first evaluations are test beds to help us get our formats tweaked out. As you're reading this, we should have it pretty much nailed down. Not only are we looking into support, service, and warranties, we're also purchasing these machines online, the way many of you would, so we get the full user experience.

So, the next time you're looking at 12 pages of benchmarks, possibly even sans any analysis, ask yourself if you're truly seeing the information that's important in solidifying your purchase. As miniscule performance differences become the new standard, I'd suggest everyone step back and take a look at the bigger picture. ▲

Kyle Bennett is editor-in-chief of HardOCP.com, one of the largest and most outspoken PC-enthusiast sites on the Web. HardOCP.com is geared toward users with a passion for PCs and those who want to get cutting-edge performance from their systems. Beware, though, Kyle is known for his strong opinions and stating them in a no-nonsense manner while delivering some of the most in-depth reviews and PC hardware news on the 'Net.

You can talk with Kyle at kyle@cpumag.com.

We didn't focus on the card, but rather the gaming experience the card delivered. After all, that's what's important to most folks.

PC Modder

Tips & Tutorials

Modding does the body good. A PC's body anyway, inside and out. Here you'll find hardware, firmware, tools, tips, and tutorials for modding your rig's performance and appearance. Send us your own mod-related tips and ideas at modding@cpumag.com.

Modding enthusiasts have a penchant for the latest toys. Fast processors, powerful video cards, silent SFF enclosures, and radically lit motherboards are all fair game when it comes to a modder's creative mind. Recognizing the appeal of unconventional customization, an entire industry has emerged to support the community.

Mods & Ends

Nmediapc HTPC 100

True HTPC-quality cases are hard to find. Square SFF boxes do the job, but you want something that'll match your receiver, DVD player, and DVR. The HTPC 100 looks like it could be a large amp. In fact, it's a microATX desktop chassis with hidden front-panel USB and FireWire connectivity and a 7-in-1 card reader. An LCD display on the front is backlit in blue, relaying CPU fan speed, processor temperature, date, time, and case temperature.

At $125 the HTPC 100 is a tad pricey, though Nmediapc includes a 270W Enermax PSU—more juice than you'd normally get with a SFF barebones system. A 60mm fan keeps air circulating, but it isn't the quietest route NmediaPC could have taken. Fortunately, sharp looks prevail, especially in the confines of an entertainment center that can dampen noise.

Get the HTPC in black or silver to match your other home theater components.

SinTek 600 SLI Power Supply

Performance PSUs are springing up everywhere in response to the unprecedented demands of Nvidia's SLI rendering technology and high-end CPUs. SinTek is the latest contender interested in selling high-wattage, feature-laden PSUs. Its rookie effort, the SinTek 600 SLI, has native support for dual 6-pin PCI-E power plugs. Nvidia doesn't yet list this unit in its run down of certified power solutions, but with its impressive specification list, there shouldn't be a problem qualifying. Even though ATI hasn't yet shipped CrossFire hardware, SinTek also lists compatibility with the rival multirendering platform.

With a host of unique features, SinTek's 600W SLI PSU is a boon for overclocking.

The 600 SLI's continuous power output peaks at 600W, and max power is rated at 708W. SinTek takes a higher road by measuring power at 41 degrees Celsius. That's not quite as hot as PC Power & Cooling's 50-degree mark, but you can be sure that SinTek's 600W is truer than competing makers who take numbers at 25 degrees. Equally important is this PSU's +12V rail, which has a beefy 34A of current.

Some of the unit's more unique features include fan control knobs for the onboard coolers; voltage knobs to augment the +12, +5, and +3.3V rails; and an LCD that continually monitors PSU temps. Though the 600 SLI is a bit pricey at $190, SinTek at least looks to be on the right track.

Coolmax 24-pin Power Supply Tester

We have a pile of PSUs in our lab. Some work, some might work, and some don't. Thus, building new test beds is often a crapshoot, beginning with troubleshooting and ending with the realization that we're using a defective PSU. This exercise in frustration is a thing of the past with Coolmax's tester.

Equipped with a 24-pin ATX input, an 8-pin/4-pin auxiliary +12V input, a 6-pin PCI-E input, SATA power inputs, and both sizes of 4-pin Molex connectors, you can really test every output for fault. This is a $12 must-have for system builders, IT managers, and power users.

Fashionably Fresh Firmware

Sony PSP v.2.0

Firmware 2.0 adds WPA, a live Web browser, wireless mode for swapping photos with other PSPs, and Portable TV support.

us.playstation.com/psp

ATI RADEON ROM Update For Mac

The update from ATI fixes many bugs with almost all Radeon Mac Edition cards.

support.ati.com

LaCie Ethernet Disk Mini USB

LaCie is purposely vague about the improvements to version 1.3 of its Ethernet Disk Mini USB firmware, but you are guaranteed the latest functionalities and fixes.

www.lacie.com/support

Plextor PC-708A Version 1.11

Plextor continues its support of legacy products with this firmware, which improves the performance of BurnProof when writing to CD-Rs.

www.plextor.com

by Chris Angelini

Hardware Be Gone!

Mod Your Software Instead

With the holiday season rapidly approaching, this issue of *CPU* is jammed with the latest and greatest PC gear available. Due to the abundance of hardware coverage, we thought we would take this portion of Hard Hat Area in a different direction this month. We still have a few tasty mods for you, but these won't require a single tool to complete. In lieu of a featured hardware mod this month, we have a couple of Windows XP software-related mods that can be as effective as a hardware mod at giving your rig a personal touch.

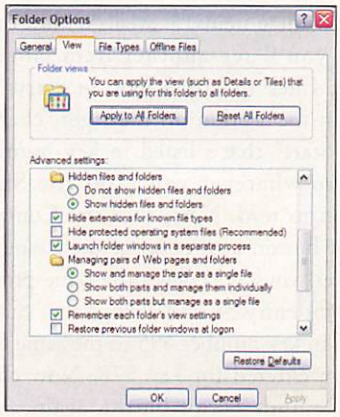
Create A Custom Start Button

It has been about four years since Windows XP was released, and in those years, most WinXP users have resigned themselves to staring at the same old Start button. It's not that there is anything particularly wrong with the button. In fact, "Start" is a logical label for the button, but enough is enough already. When equipped with the right utility, modifying the start button to say almost anything you want takes nothing more than a few minutes and a little courage.

Are you as tired as we are of looking at the plain, old default Start button? If so, then it's time for a change.

Step 1. Before we explain just how to complete this mod, we need to make the standard disclaimer: Anytime you alter a critical system file, you run the risk of introducing a catastrophic failure. So, before making a single mouse click, back up all your data and read this entire article first.

To begin this mod, you'll need to alter a few key settings and download the free Resource Hacker utility, which you can find at www.angusj.com/resourcehacker.


Folder Options
General
View
File Types
Offline Files
Folder views
You can apply the view (such as Details or Tiles) that you are using for this folder to all folders.
Apply to All Folders
Reset All Folders
Advanced settings:
Hidden files and folders
Do not show hidden files and folders
Show hidden files and folders
Hide extensions for known file types
Hide protected operating system files (Recommended)
Launch folder windows in a separate process
Managing pairs of Web pages and folders
Show and manage the pair as a single file
Show both parts and manage them individually
Show both parts but manage as a single file
Remember each folder's view settings
Restore previous folder windows at logon
Restore Defaults
OK
Cancel

You need to make some hidden and protected system files visible before you can complete this mod.

Resource Hacker has been available for quite awhile, but age has done nothing to diminish the usefulness of this handy, little application, which can view, modify, rename, add, delete, and extract resources in 32-bit Windows executables and resource files. Resource Hacker also incorporates an internal script compiler and decompiler and works on all versions of Windows from Windows 95 through WinXP. We'll be using the application to alter a few strings in the Explorer.exe file.

After saving our changes and relaunching Explorer.exe, our new custom *CPU* Magazine Start button was available. You'll notice that you can use more than five characters, and that the Start button will stretch accordingly.

After you've downloaded and extracted Resource Hacker, the next step is to unhide WinXP's hidden files and protected operating system files. In My Comp-uter click the Tools menu and click Fol-der Options. In the Folder Options dialog box, click the View tab. In the Advanced Settings section, look for the Hidden Files And Folders section. Click the Show Hidden Files And Folders radio button and remove the check mark for the Hide Protected Operating System Files (Recommended) option. Click OK to close the Folder Options dialog box.

Step 2. The next step in this mod is to remove Explorer.exe from WinXP's built-in file protection mechanism. If you don't do this, as soon as you modify the file, Windows will replace it with a known good backup copy and reset the mod. Before removing the protection, though, make a backup copy of Explorer.exe and store it in a safe location as a precaution. Explorer.exe should be located in your Windows directory, normally C:\WINDOWS.

To remove Explorer.exe from WinXP's File Protection, browse to your C:\WINDOWS\SYSTEM32\RESTORE folder and locate a file named Filelist.xml. Right-click the Filelist.xml file and select Properties from the context menu. At the bottom of the resulting dialog box, remove the check mark for the Read-only option and click OK. Next, open Notepad and drag the Filelist.xml file into the window. You should now see the file's contents. Toward the top of the file's text, locate the <Exclude> tag. In this section you need to add the following line:

<REC>%systemroot%\explorer.exe</REC>

You should see numerous other files listed in this section, as well. Make sure that the syntax of the file you're adding is similar to those shown. Once you have added the line, close Notepad and save the file. Now, right-click the Filelist.xml file again, select Properties from the menu, and reset the file's Read-only status.

Next, browse to the C:\WINDOWS\SYSTEM32\DLLCACHE folder. You should see a backup copy of Explorer.exe.

here. Rename this file to something similar to Old_explorer.exe. This is the backup copy that the Windows File Protection mechanism will use should it detect a problem with the original file.

Step 3. With the previous steps complete, we can now perform the actual mod. As a precaution, disable or close any unnecessary applications or processes that are running in the background on your system. Now launch Resource Hacker. With the program running, open Task Manager. In the Task Manager window, click the Processes tab. In the Image Name column, find Explorer.exe. Right-click the file and choose End Process from the menu. A system warning will appear that states terminating a process can cause undesired results. Click Yes to close the warning. With Explorer.exe terminated, your Desktop and Start menu will disappear, but any applications that were running will remain visible. This behavior is normal.

From within the Resource Hacker window, click the File menu and click Open. Now browse to your C:\WINDOWS folder and open Explorer.exe. You'll see a slew of items listed in the hierarchy tree to the left. In the list find String Table and expand the section by clicking the plus sign. Now find entries 37 and 38 and click the plus sign to expand these items, as well. Within each item you'll see another item labeled 1033. Click the 1033 item in entry 37, and in the section on the right, change the "Start" that's listed in key number 578 to whatever you want the Start button to read. Now, click the Compile Script button at the top of the Resource Hacker window. Follow the same procedure for entry 38 and change the "Start" listed in key number 595 to the same text as you entered for key 578. Now click the Compile Script button again, save your changes, and close Resource Hacker. You may see a warning that states that Explorer was replaced with an unrecognized version, but just click Cancel to ignore the warning.

Step 4. The only thing left to do now is admire your handy word. Open Task Manager again, click the File menu, select New Task, and in the Open field type **explorer** and press ENTER. The Windows shell will launch, and your new Start button should be there.

A Customized Boot Screen

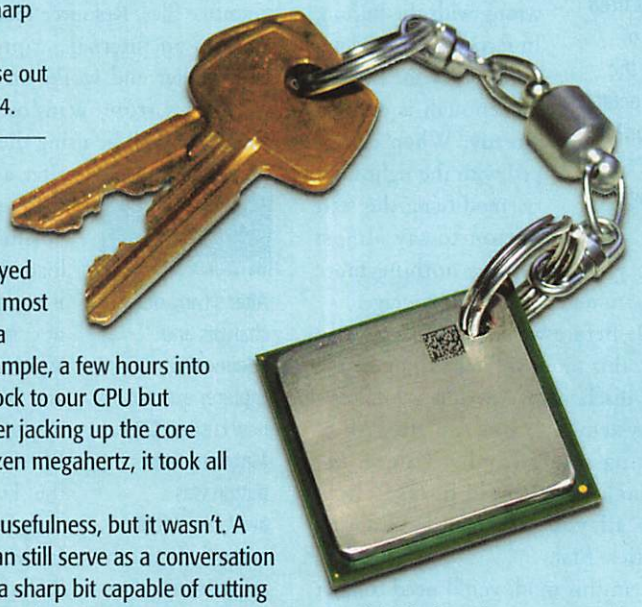
Another one of WinXP's more mundane attributes is its bland boot screen. However, you can alter the boot screen, and fortunately, doing it is easier than altering the Start button. To create your own boot screen, all you need is a little imagination and a copy of TGT Soft's StyleXP. Unlike Resource Hacker, StyleXP isn't freeware, but a 30-day trial version is available for download at www.tgtsoft.com. In addition, the boot screens that the trial version creates will

Pentium 4 Reincarnation Mod: Having Fun With A Dead CPU

Even Gordon Moore couldn't bring this fried processor back to life. However, with a sharp drill bit and a little elbow grease, we made some use out of our deceased Pentium 4.

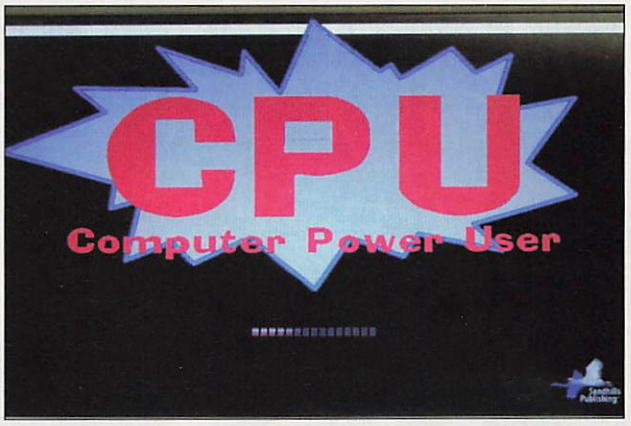
All of us have taken a mod too far, and in the process destroyed an otherwise useful piece of hardware. Although we spend most of our time evaluating, modding, or otherwise tweaking PCs on a daily basis, we're not immune to the occasional mistake. For example, a few hours into an overzealous overclocking experiment, we fastened a waterblock to our CPU but neglected to check if it was making proper contact. It wasn't. After jacking up the core voltage and increasing the front side bus frequency by a few dozen megahertz, it took all of a few seconds to fry the processor. Poof!

You would have thought that was the end of that processor's usefulness, but it wasn't. A fried CPU may no longer be able to power a gaming rig, but it can still serve as a conversation starter at the next LAN party or geek-fest. All you need is a drill, a sharp bit capable of cutting metal, and a key ring and you have the makings of the perfect key chain for a power user. We drilled a hole straight through the dead processor's heatspreader, fed a key ring through the hole, and voila. Don't hide your modding mishaps—show them off for all to see. ▲



This fried Pentium 4 may not be crunching numbers any longer, but that doesn't mean it isn't still useful.

TGT Soft's StyleXP program can help you modify many of Windows XP's attributes, including boot screens, themes, visual styles, icon sets, and more, in a number of ways.



Here's a shot of the humble CPU boot screen that we created with TGT Soft's StyleXP application, complete with the Sandhills Publishing logo, in action. Also notice the matching progress bar.

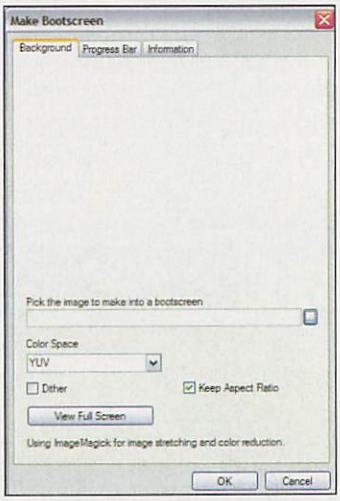
remain active after the trial period has expired. Here's how to perform the mod.

Step 1. The first step to creating your own boot screen is to unhide WinXP's hidden files and the protected operating system files. We explained how to do this previously in Step 1 of the Start button mod. You'll also need to download and install a copy of StyleXP. Make sure the version you download is 3.10 or later, as older versions lack a feature necessary to convert standard bitmaps into a format usable by WinXP for a boot screen.

Step 2. Now comes the hard part. Open Paint or the image editing application you prefer and create a new image that's 640 x 480. This is the image that will eventually become your boot screen. You can create whatever your heart desires here. Normally, you'd have to use a specific palette of colors and create a file of a specific size to make a valid boot screen, but StyleXP will handle the conversion, so you can be creative here. We found that using a few colors and not having dithered patterns worked best. Once you're happy with the image that you've created, save it as a standard bitmap file. We created a simple *CPU* boot screen as an example.

Step 3. Next, it is time to take a little precaution. Make backup copies of the Boot.ini file that is located on the root of your C: drive, and back up the Ntoskrnl.exe file located in your C:\WINDOWS\SYSTEM32 folder. StyleXP will modify or replace these two files, and although the program will create its own backups, it is best to keep copies of these original files handy, as well.

With those files backed up and your 640 x 480 image created, you can now use StyleXP to convert and insert your new boot screen. Launch StyleXP and click the Bootscreen button in the menu on the left. You will see a warning that the Boot.ini file needs to be modified. Click OK to accept the default modifications. Then click the Make Bootscreen button and browse to the image file that you created earlier and click OK.



StyleXP's Make Bootscreen option can convert a Windows bitmap file into a format that's suitable for use as a Windows XP boot screen.

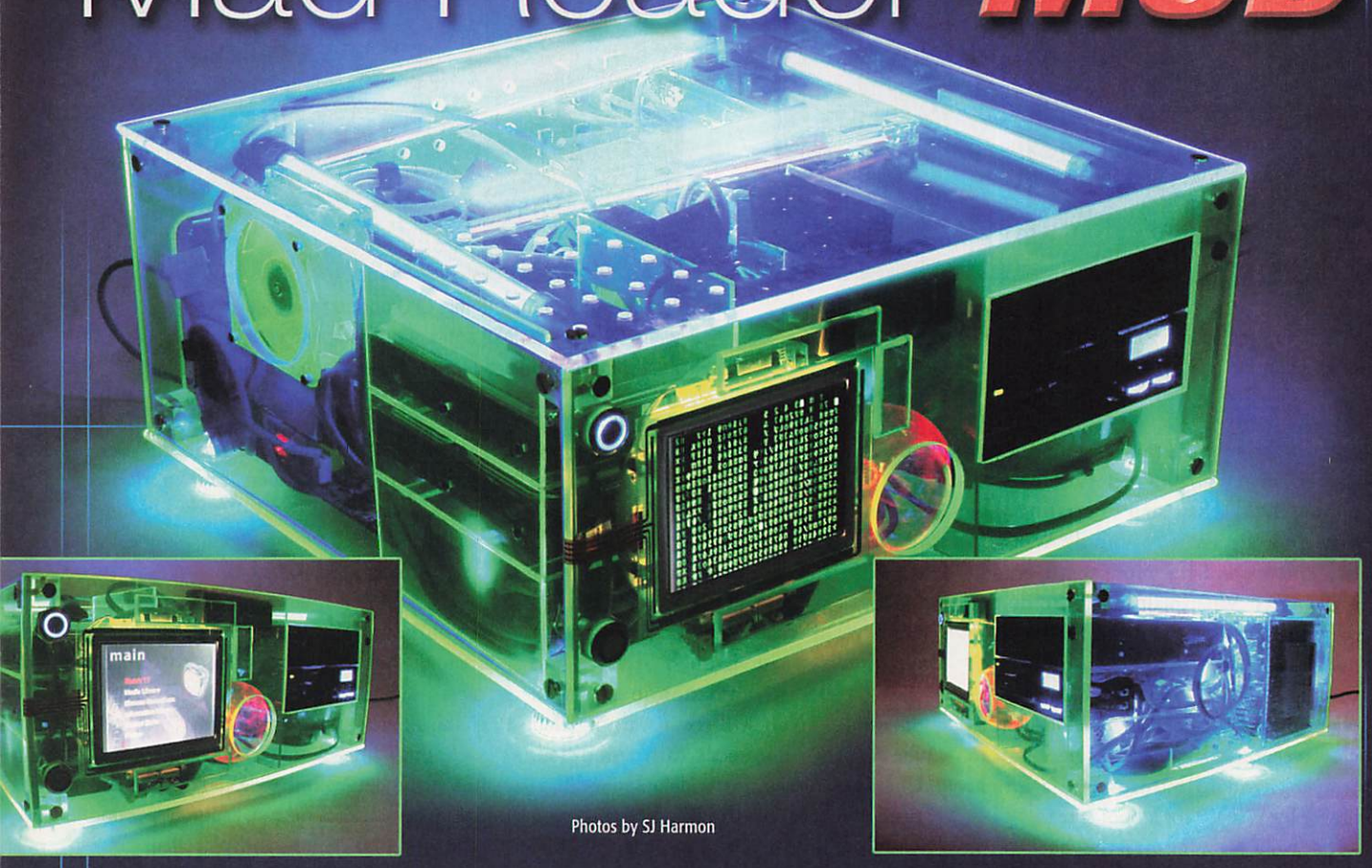
This will take the image file that you created earlier and convert it into a format that's useable by WinXP. We should note that at this point, you could also import a custom progress bar, but this isn't necessary. StyleXP will color-match a progress bar automatically to the image that you created, and unless you want to change the on-screen position of the progress bar, creating a new one isn't necessary.

At this point select your new boot screen from the menu within StyleXP and click the Apply Bootscreen button. Your new boot screen will be created and placed in your C:\WINDOWS\RESOURCES\BOOT folder. In a few moments a notification will greet you, indicating that the boot screen will be available upon your next reboot. Click OK in the notification window, close StyleXP, and restart your computer.

Step 4. Upon restarting your machine, you'll see a boot menu with what appears to be the choice of two operating system installations. Select the first choice that's labeled Microsoft Windows XP Professional (bootscreen) to launch Windows and witness your new boot screen. Should everything function properly, you can then edit the Boot.ini file to eliminate the boot menu and load WinXP without any user interaction. Simply open Boot.ini in Notepad and change the value listed in timeout= to 0. **CPU**

by Marco Chiappetta

Mad Reader MOD



Photos by SJ Harmon

Now That's a PVR!

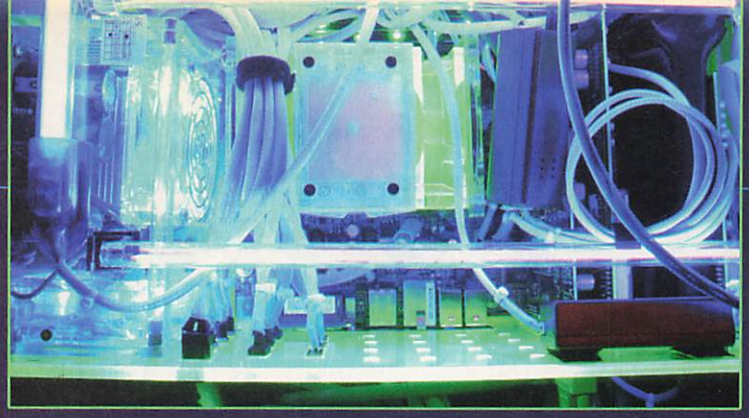
Despite the power and freedom that entertainment PCs deliver, the much-heralded PVR invasion of the living room has really been more of a trickle. Perhaps that's because most entertainment computers resemble bulky stereos—they don't exactly scream entertainment. Greg Lindley set out to create an entertainment PC that had real attitude and which let him manage his media setup how he saw fit. "I wanted to have a unit that I could control and enhance without relying on any manufacturers," Lindley says. "I have yet to see a product that has what I want and for a reasonable price or one where the manufacturer doesn't take advantage of the consumer . . . besides, I haven't seen a commercial solution that is wireless, has a menu-driven touchscreen, allows a shell level access, etc."

Lindley can control MythTV via his system's front-panel touchscreen. Of course, the touchscreen isn't particularly useful if you are on the couch, so Lindley also picked up a Gyration keyboard and mouse. Several system builders bundle the keyboard and handheld mouse combo with their PVR systems, but many builders favor Microsoft's Windows XP Media Center Edition operating system. "With Linux and MythTV, I am in control, and the machine does what I want," Lindley says. "Where there are instances that the software doesn't meet my needs, I recoded it to do what I want—something you can't do with proprietary solutions."

So what does a tech DIYer put into a home-entertainment box? Lindley loaded the Touchscreen PVR with 1.5GB of memory, an AMD Athlon 64 3200+, and a DFI LANParty NF3 mobo. The box also includes an ATI Radeon 9600 graphics card and AirLink 802.11g card. Those aren't bad specs for a PVR, but what really caught our attention were the hard drives and video capture/TV tuner cards. Lindley stores movies in the faster 300GB SATA hard drive and stores TV shows in the 250GB IDE drive. A Hauppauge WinTV-PVR 350 and WinTV-PVR 150 handle his video capturing needs.

If today's big-name builders take some tips from this design, that living room invasion might just get off the ground. ▲

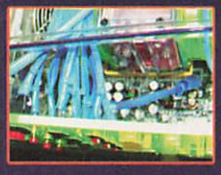
by Joshua Gulick



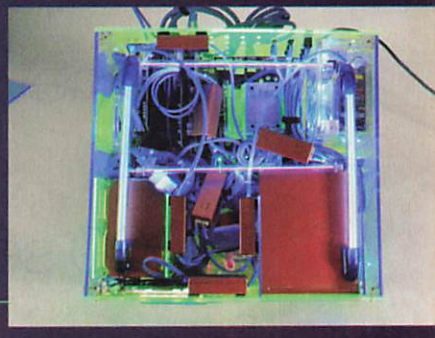
Feel as though something is missing? The rig's CPU is buried under all that UV-sensitive plastic. Lindley used the AeroCool HT-101 copper heatsink to chill the processor. The heatsink includes its own UV-sensitive shell.

If the movie doesn't entertain you, the miniature plasma ball will; if you touch the ball, the lights inside will chase your fingers. Lindley cut a hole in the case's front so you can easily reach the ball.

No one wants to untangle cords while sitting on the couch, so Lindley bought a small wireless keyboard and mouse that responds to movement and surfaces. Now you have an excuse to gesture at the TV.



Each cable has sleeving. Note the copper heatsink in the background. Fans sit on either side of the heatsink to force air through it horizontally.



Lindley says that between the neon lights and other components, this system has more than 100 feet of cabling. "I sleeved them, used UV-reactive heat shrink on them, and UV-reactive cable ties to ensure the heat shrink doesn't slip."

Lindley used a hole cutter to create the perfect hole in the front panel that allows access to the plasma ball. "It has two blades that spin around the central axis," Lindley says. "You can adjust the space between these blades, and it cuts plastic real well."

Thanks to the tall chassis, the Touchscreen PVR easily holds two hard drives. Lindley wired the Bulgin buttons himself. He wired the power button so that it blinks at first and then stays lit when the computer powers on.

The lights probably won't need adjusted often, so Lindley put the controls on the back. The switches handle all the lights, including the light sticks at the top and the lighted feet at the bottom.

Give Us Your MOD

Have a computer mod that will bring tears to our eyes? Email photos and a description to madreadermod@cpumag.com. If we include your system in our "Mad Reader Mod" section, we'll send you a $1,500 Newegg.com gift certificate and a one-year subscription to CPU.

advanced Q&A corner

Get informed answers to your advanced technical questions from *CPU*. Send your questions along with a phone and/or fax number, so we can call you if necessary, to q&a@cpumag.com. Please include all pertinent system information.

> "A good way to tax the new GeForce 7800 series cards while taking temp readings is with Masaki Kawase's rthdribl."

Each month we dig deep into the mailbag here at CPU *in an effort to answer your most pressing technical questions. Want some advice on your next purchase or upgrade? Have a ghost in your machine? Are BSODs making your life miserable?* CPU*'s "Advanced Q&A Corner" is here for you.*

Gerald D. asked: I'm looking to build a new computer with the following specs:

Thermaltake XASER, Armor Series VA8000BWS case
Gigabyte GA-K8N Ultra-9 M/B
AMD Athlon 64 3800+
4GB DDR PC3200 RAM
128MB DDR video card
2 Plextor PX-716A drives
1 floppy drive
1 120GB ATA drive
1 500GB ATA drive
4 SATA-1 drives in a striped RAID configuration
4 SATA-2 drives in a striped RAID configuration
5 120mm fans
2 80mm fans

With these specs I'm not sure if any manufacturer makes a power supply that would suit me. Do you know of one that does or one that makes a quality custom power supply that will be able to handle this system?

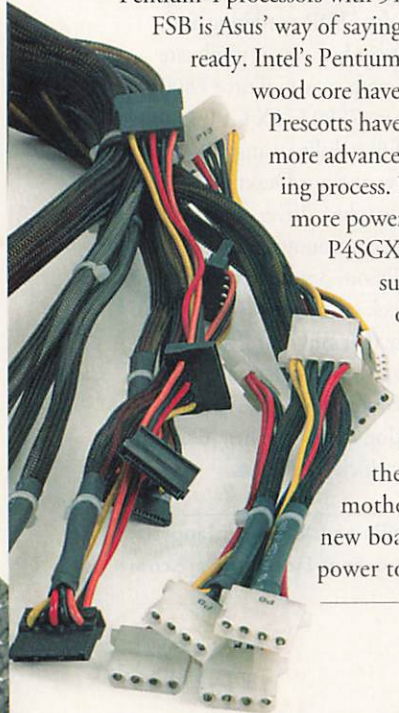
PC Power & Cooling's Turbo-Cool 850 SSI supplies 850W of continuous power with a peak output of 950W.

A: With 10 hard drives, two DVD burners, and seven case fans, your concerns about supplying power to your system are justifiable. The drives alone will consume more power than the majority of complete systems sold today. If you absolutely must have these specifications though, you have two options. The first option is to replace the Thermaltake XASER VA8000BWS case with another enclosure that can accommodate dual power supplies such as 3R System's R900 (which includes all of the wiring you would need to run a pair of power supplies in tandem). With this type of setup, you can use one PSU to power the motherboard, video card, optical drives, floppy drive, and a pair of your hard drives, and the other PSU can power the remaining hard drives and fans. We'd still recommend going with some beefy power supplies, however, with at least 550 to 600W each. (Check out the power supply roundup in the September 2005 *CPU* on page 16.)

The second option, if you're set on the Thermaltake case and have to get by with one power supply, is PC Power & Cooling's Turbo-Cool 850 SSI PSU. The 850 SSI is the most powerful ATX PSU currently available. It's capable of supplying 850W of continuous power with a peak output of 950W. The 850 SSI will fit in any standard ATX case with a 20-inch depth and has four +12V rails at 17A each, 15 drive connectors (including six SATA), and dual PCI Express video connectors. Without knowing exactly which drives you plan to use (and their peak power requirements), we can't guarantee that the 850 SSI will meet your requirements. So, if you don't think the 850 SSI will suffice, go the dual-PSU route or cut down the number of hard drives in your system.

Deryl asked: I have an Asus P4SGX-MX motherboard flashed with the latest BIOS and a 1.7GHz Pentium 4 installed. I'm thinking of upgrading the processor, but the manual says that it will only support Intel processors with 512KB of L2 cache. The Web site is unclear about what the BIOS update changes. Can I stick a Pentium 4 with an FSB of 533MHz and 1MB of L2 in it, or do I have to stick with 512KB?

A: It seems that by limiting the P4SGX-MX motherboard to using Pentium 4 processors with 512KB of L2 cache and a 533MHz FSB is Asus' way of saying that the P4SGX-MX is not Prescott ready. Intel's Pentium 4 processors based on the Northwood core have 512KB of L2 cache, but the newer Prescotts have 1MB of L2 and are built using a more advanced 90nm strained silicon manufacturing process. Unfortunately, Prescotts are also more power hungry. The SiS650GX chipset the P4SGX-MX uses is technically capable of supporting Pentium 4 processors based on the Prescott core, but we suspect the P4SGX-MX can't handle the newer chip's power requirements.



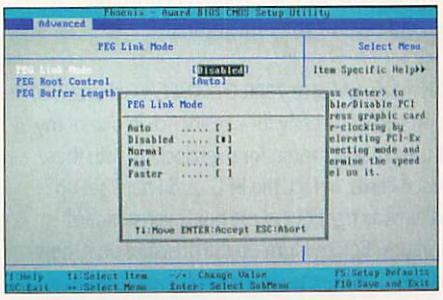
Upon the initial release of Pentium 4 processors based on the Prescott core in early 2004, most motherboard manufacturers also released new boards that were capable of supplying power to the new chip. Back then, Intel recommended that motherboard manufacturers design boards that could handle a maximum thermal envelope of 110W to accommodate Prescott. This is probably why your P4SGX-MX isn't compatible with Pentium 4 processors with 1MB of L2 cache. Your P4SGX-MX's VRM can't supply power to a Pentium 4 processor based on the Prescott core. If you can find a higher-clocked Pentium 4 processor based on the older Northwood core, however, you should be fine. And, clock for clock Northwoods are actually faster than Prescotts in most circumstances anyway.

Robert G. asked: I'm evaluating parts for a major system upgrade and investigating the latest generation of PCI-E-enabled motherboards for the AMD platform along with a decent but more general purpose graphics card to go with it. I've been looking at an Asus motherboard called the A8N SLI Deluxe but have heard concerns about its PEG Link Mode technology not being able to play nice with several 3D cards on the market. Any insight as to what PEG Link is, what it does, and if I should really be concerned?

A: Essentially, Asus' PEG (PCI Express Graphics) Link Mode technology enables PCI-E graphics card overclocking automatically via the motherboard BIOS. Upon its introduction, Asus was a bit vague about what PEG Link Mode did. But later on the company came out with press releases stating that PEG Link Mode technology was an "official" new feature incorporated into Asus' new PCI-E-based motherboard designs.

Consequently, this technology treats ATI and Nvidia graphics cards differently, so depending on your PCI-E 3D graphics card of choice, performance and stability could vary. In short, depending on the setting in the BIOS (Auto, Faster, Fast, Normal, Disabled, Slow), in combination with the graphics card, PEG Link Mode could slightly overclock the GPU, Memory, or both. Some say PEG Link Mode only overclocks Memory on Nvidia cards and GPU Core speed on ATI cards, but we've seen many combinations in the HotHardware.com labs.

Frankly, if you're not comfortable with the PEG Link Mode feature, you can disable it entirely. But, check your card's clock speeds with utilities such as PowerStrip, the Nvidia Coolbits Registry tweak, or ATI's Overdrive, to see what PEG Link Mode is doing in your setup. And because you're not going to be looking for all-out gaming performance, the PEG Link Mode feature probably doesn't afford you much advantage anyway. The A8N SLI Deluxe (or the A8N SLI Premium) is a good motherboard choice, however, and Asus does let you turn off the PEG Link Mode feature.



Asus' PEG Link Mode technology is an automatic PCI-E graphics overclocking feature in the BIOS that acts differently depending on what model Nvidia or ATI graphics card is installed.

Truant asked: My son purchased his first gaming computer with some bargain components. (The components need to be compatible in order to play World Of Warcraft.)

Gigabyte GA-7VT600P-RZ
AMD Sempron 3000+ SocketA
Viking 256MB PC3200 DDR
Generic 256MB PC3200 DDR
Hitachi 40GB SATA 7200/8MB/SATA-150
Toshiba 16X DVD
Diablo ATX case with generic 450W PS
1st) XFX GeForce FX 5200 128MB 8X AGP
2nd) PNY GeForce FX 5200 128MB 8X AGP
WinXP Professional

I also installed Lavalys' Everest software on the PC. When monitoring the voltages, the +5 volt reading jumped between 2.2 and 5.3V, but the computer ran fine for two months and then the first video card began to lock up. I changed video cards to the PNY card, which lasted one week and then completely disabled the computer from booting up.

Since then I've changed the power supply to an OCZ 520W PowerStream PSU and installed another PNY graphic card. Now the PC has been running for two weeks, but the +5 volt reading still jumps around. I have two other computers running the same monitoring software, and they show stable voltages. We haven't attempted any overclocking. Is the motherboard faulty or could it be some other component?

A: The VIA chipset-based Gigabyte board you've chosen is a solid solution for your son's machine. Also, the GeForce FX 5200s should work at moderate to low resolutions in WoW (you can get more powerful 3D cards). Regardless, along with the 520W OCZ power supply, you shouldn't have many issues with your setup.

Nevertheless, the voltage fluctuations you're getting across the 5 volt rail are puzzling for sure. We've never head of Lavalys Everest software, and we're skeptical that it or your motherboard is reporting the 5V signal correctly. A 2.2 to 5.3V swing isn't good, but because you noted that things have stabilized since you got the new PSU, it's more likely that the software you're running is polling the health monitoring chip on your board and reporting back an inaccurate reading. We suggest running Motherboard Monitor (mbm.livewiredev.com) to see if you get similar results. If you do, it could then be that the health chip on the motherboard is a bit flaky, or you have a 5V regulation problem. Also, as a precaution, check for possible shorts inside your chassis, especially where the motherboard sits on the case stand-offs and any bare lead connectors that could be floating around grounding out inside the system somewhere. If this condition persists (and your system is unstable), it might be a bad voltage regulator on the motherboard.

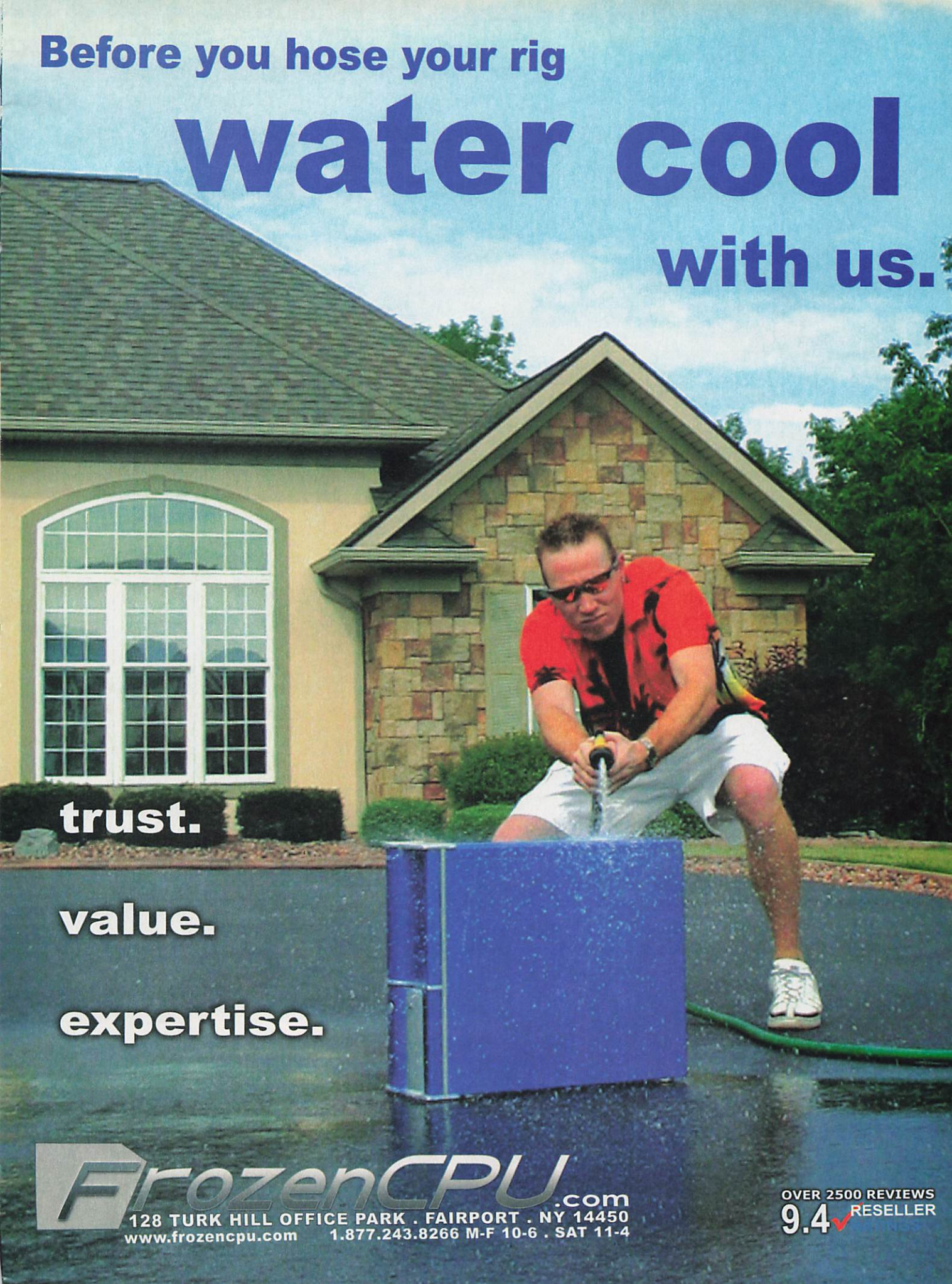
Stephany B. asked: Nvidia's GeForce 7800 GTX (BFG's GeForce 7800 GTX OC version) graphics processor recently took residence in one of my gaming rigs. I've read that there's some room for overclocking with these Nvidia GeForce 7 series-based cards. In fact, the BFG card I have set up now is slightly overclocked already right out of the box, over standard GeForce 7800 GTX specifications. Before I turn up the pressure on it, however, I'd like to understand how hot the card is running when stressed in a gaming scenario. Any recommendations of utilities or benchmarks that will let me tax my new GeForce 7800 GTX and see peak temps for the GPU?

A: The GeForce 7800 GTX is a powerful GPU and stressing the card to its limits while monitoring its active peak temperatures isn't easy. In fact, Nvidia's core GPU design is sophisticated in terms of on-chip clock and circuit throttling for power/heat management reasons. We've often taken control panel temp readings in the labs immediately after dropping from a heavy duty gaming test to the Desktop, only to find out that in the few seconds it took to switch resolutions and applications, the GPU had already cooled down a few degrees. Of course you can ALT-TAB back to the Desktop and take readings that way, but again, you need to make sure you're running a game or utility that really taxes this powerful GPU.

A good way to tax the new GeForce 7800 series cards while taking temp readings is with Masaki Kawase's rthdribl (Real-Time High-Dynamic Range Image-Based Lighting) utility (www.daionet.gr.jp/~masa/rthdribl). This utility tests the HDR rendering and IBL capabilities of leading-edge graphics cards. Even at moderate resolutions, it's a serious gauntlet to run your new GeForce 7800 GTX through. In fact, we've seen GeForce 7800 GTX GPU core temps hit near 80 degrees Celsius with full stability using this utility. You can also run rthdribl in a window on your Desktop, so you can monitor GPU temps through your graphics driver control panel while it's running. We'd suggest running continuous loops of 3DMark05 or perhaps high-resolution Doom 3 timedemo loops and ALT-TABing to the Desktop to check your temps. We've seen the GeForce 7800 GTX (and specifically that BFG card you have) hit 490 to 500MHz in core GPU speed and 1.4GHz in memory speed with good stability with its stock cooler. Just make sure you have good case ventilation because you don't want the heat buildup that can come along with these excessive clock speeds. ▲

The rthdribl utility showcases HDR rendering effects on leading-edge 3D graphics cards.

by Dave Altavilla and Marco Chiappetta, the experts over at HotHardware.com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9.4 RESELLER

Tablet Technology

Teach A Tablet To Read

It's been about three years and a million units sold since launch, and still the pen-based Tablet PC remains the Microsoft idea critics love to deride as a misfired interface "revolution." Nevertheless, Tablets perform two cool technical tricks: a screen that tracks and interprets pen movements as mouse commands, and software that transforms handwriting into text.

A Pen, Not A Finger

With stylus input, Tablet displays get mistaken for touchscreens, when they're not at all pressure sensitive. Tablets are active digitizers that radiate a magnetic field from a matrix of antennae beneath the LCD to track the pen's movement. Within an inch of the screen surface the stylus' circuitry resonates with the magnetic field to reveal its position across three dimensions (X, Y, and Z axes). In a hover zone above the LCD surface, sharp movements of the stylus can communicate commands (gestures).

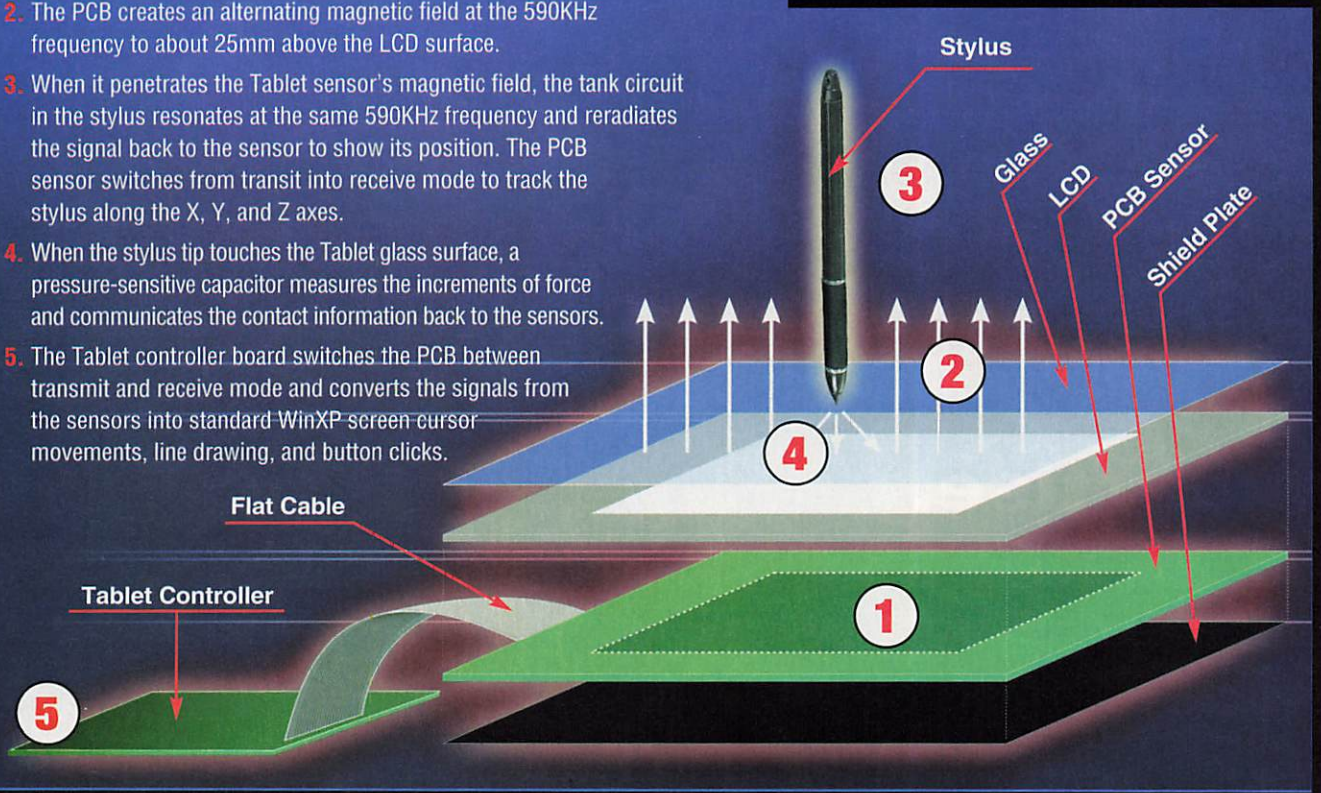
The stylus, not the Tablet screen, registers contact with the display. Pressure sensors at the tip not only send the pen down signal when the tip touches the surface, but also register up to 1024 increments of pressure. And paint programs can translate these increments into thicker or lighter brush strokes.

Can You Read This?

Once the pen hits screen, Microsoft's Windows XP Tablet PC Edition includes a highly evolved software algorithm that turns your analog squiggles into digital text. The TIP (Tablet Input Panel) pops up anywhere on-screen to accept both cursive and block character input. Turning drawn lines into text requires an eight-step process that occurs within seconds. (See the "Ink To Text" sidebar.) First the handwriting recognition engine

Tablet Controller: Recognizing The Pen

1. Coiled antennae form a matrix on a PCB (printed circuit board) sensor beneath the Tablet's LCD screen.
2. The PCB creates an alternating magnetic field at the 590KHz frequency to about 25mm above the LCD surface.
3. When it penetrates the Tablet sensor's magnetic field, the tank circuit in the stylus resonates at the same 590KHz frequency and reradiates the signal back to the sensor to show its position. The PCB sensor switches from transit into receive mode to track the stylus along the X, Y, and Z axes.
4. When the stylus tip touches the Tablet glass surface, a pressure-sensitive capacitor measures the increments of force and communicates the contact information back to the sensors.
5. The Tablet controller board switches the PCB between transmit and receive mode and converts the signals from the sensors into standard WinXP screen cursor movements, line drawing, and button clicks.



Cross Section Of A Section Assembly & LCD

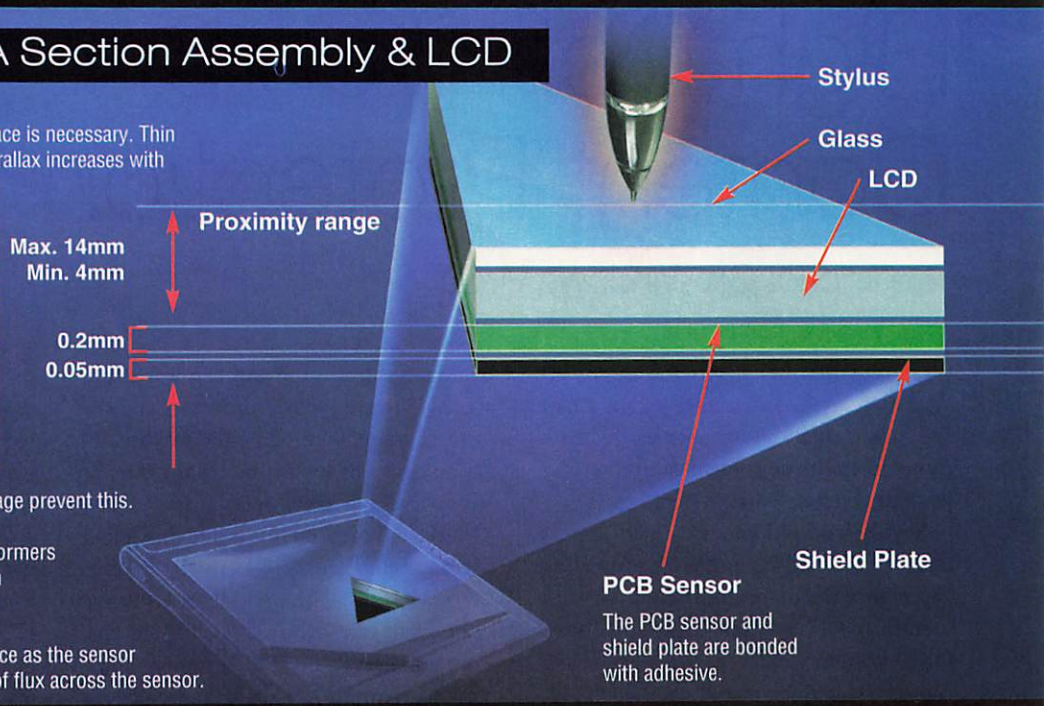
Glass
To protect the LCD, a glass top or other surface is necessary. Thin tempered glass is recommended because parallax increases with glass thickness. Some LCD units have built-in protection against surface contact.

LCD
The LCD's rear panel must use material that doesn't intercept electromagnetic waves.

Others
Some transformers or coils the power unit uses can generate strong noise that can influence the sensor board. Transformers or coils with low magnetic flux leakage prevent this.

Manufacturers should place coils and transformers underneath the shield or separate them from the sensor board.

If coils and transformers are in the same place as the sensor board, this will help minimize the influence of flux across the sensor.

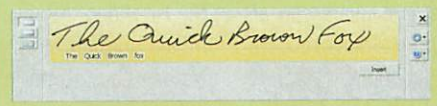


Ink To Text

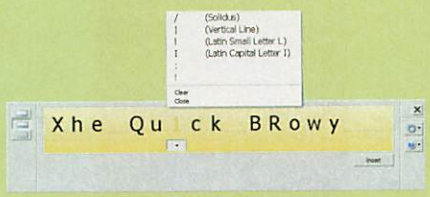
Microsoft's handwriting recognition engine processes your inked handwriting through an eight-stage pipeline in order to interpret it as text.

1. The engine deslants and rotates the ink to form a horizontal baseline.
2. Ink strokes are smoothed, sizes normalized, and irrelevant noise is removed.
3. Ink strokes are parsed and assigned to discrete lines and words.
4. Ink strokes are broken down into segments (letter groups and words).
5. Segments are featurized (turned into shapes more recognizable to the language classifiers).
6. Classifiers interpret the segments and create a lattice of alternatives (a set of possible meanings for the lines scored according to their likelihood of matching the letter the individual intended).
7. Language models and dictionaries are applied to the lattice to interpret these letter strings as words.
8. The text results of two separate recognition engine interpretations of the ink are compared to determine and put on screen the most likely translation of ink to text.

straightens and smoothes the handwritten image, eliminating noise and sharp strokes. The engine then parses word segments and letters, which a classifier interprets into a set of likely possible meanings. These alternatives run through a language model, dictionary, and database of common usage, which deduce the most likely translation of your scrawl.



By offering users cursive, print, and number fields for ink input, the Tablet helps narrow the ink-to-text translation possibilities and improves the recognition engine's accuracy.



By clicking individual characters in the text translation, the Tablet illustrates how the recognition engine operates. It ranks the likeliest text interpretations of each inked character, considers the context of the rest of the letters and words within the phrase, and then determines the most likely translation.

If the engine knows the input type to expect (numbers, block letters, technical terms, etc.), it narrows the possible matches to your handwriting for greater accuracy. (For Western languages, the Tablet only needs to accommodate about 100 possible characters.) Once the engine determines the likeliest word and letter segments, it runs the same handwriting through two separate classifiers with different algorithms and then combines and compares the results with neural networks in order to produce a final translation of your ink input.

Coming To A Laptop Near You?

Tablet technology may become more relevant to a broader range of users as Microsoft tries to mainstream the platform. Convertible notebooks are standard portables with Tablet displays that swivel and lock over the keyboard to convert into Tablets. Microsoft and OEMs such as Toshiba and HP hope to add a Tablet option to laptops for only $100 to $150. By the time you buy your next portable PC, adding a Tablet option to your standard keyboard interface may be as simple and inexpensive as checking a box to add a larger hard drive to your online PC order. ▲

by Steve Smith

High Definition & Content Protection

The Impact On Windows Vista

When Microsoft releases Windows Vista, there will be a new sheriff in town, at least when it comes to enforcing content protections for premium high-definition video.

Several components that will appear inside Vista will be aimed at protecting copyrights for premium digital content, specifically HD video content. Vista's DRM features will let the OS manage and enforce limitations placed on the content by the creators of that content. Also, Vista will have a Protected Environment within the OS that will control the playback of premium content. If the features in Vista work as planned, they will prevent unauthorized software and hardware from accessing the premium content.

In addition, controlling the playback of HD video will be an important part of Vista via components such as PVP-OPM (Protected Video Path-Output Protection Management) and PVP-UAB (PVP-User-Accessible Bus). (See the sidebar "Authenticate Hardware With PVP-OPM & Play Content With PVP-OPM" for more information.) Vista also will contain protections for audio, but we'll focus on video here.

HDCP

To understand HD content protection, we must discuss HDCP (high-bandwidth digital content protection). HDCP is a protection scheme designed for high-end video. Any use of HDCP in hardware or software requires a license from Intel and must follow the Intel specification.

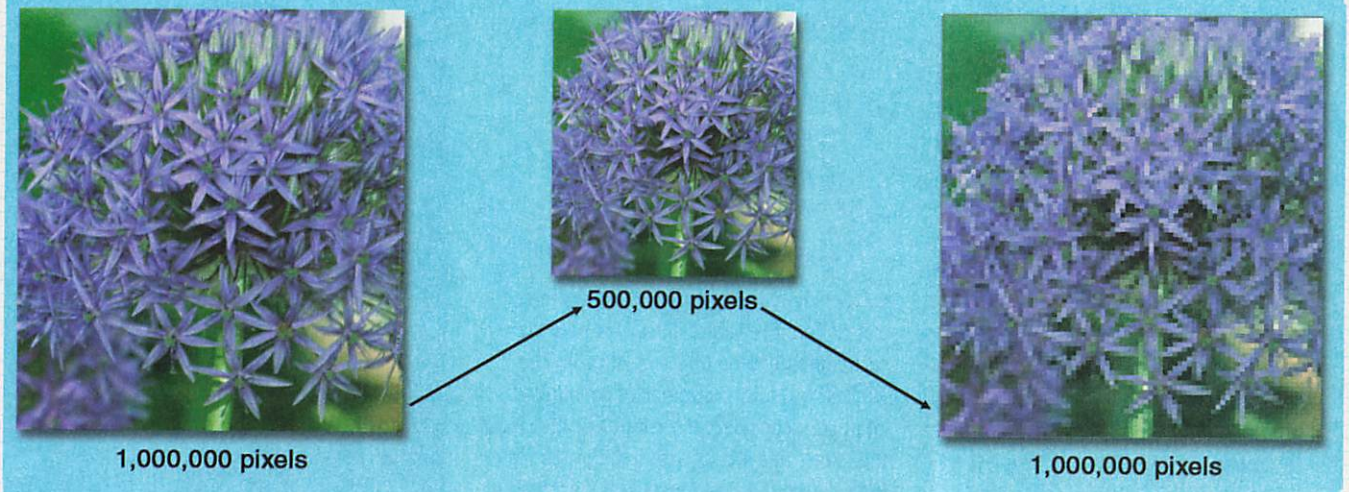
HDCP isn't designed to protect content users from copying content; that falls to the hardware that plays the content. Instead, HDCP ensures that each piece of hardware that wants to play content is authorized to play it, including all displays. (See the "Utilize HDCP" sidebar.)

Because HDCP has the full support of HD video content providers who are looking to protect their products, companies such as Microsoft and Apple say they

Make Use Of Resolution Constriction

The idea behind resolution constriction is that end users can at least access the content, but because it's at a much lower resolution, hackers won't be interested in making illegal copies of it.

In essence, resolution constriction takes HD video and degrades the quality. The graphics hardware shrinks the frames in the HD video, removing pixels. Once the frames reach a predetermined number of pixels, the graphics hardware then enlarges the frames back to the original number of pixels, causing pixelation in the frames and making them appear fuzzy. ▲



Source: Microsoft

Authenticate Hardware With PVP-OPM & . . .

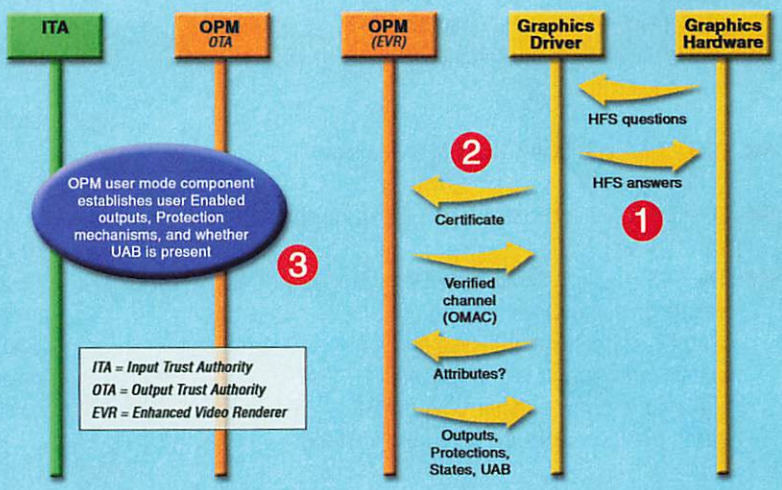
PVP-OPM will be part of Windows Vista and provides the ability to play HD video content securely and by the rules the content provider sets.

HD content plays after it goes through a successful authentication process of the available hardware. As it's playing the content if the graphics driver detects something out of the ordinary that could indicate a possible content hack, Vista will reset the entire system, starting again at step 1 to reverify the HD video content and the hardware.

1. To begin the process, all software drivers that play the content must authenticate the hardware using an HFS (Hardware Functionality Scan). This occurs each time the computer reboots or awakens from hibernation mode. The authentication makes sure that the graphics hardware device isn't an emulation device and determines the number and nature of any output connectors.

2. The OPM software then makes certain the hardware device has a PVP-OPM certificate. This ensures the hardware complies with all PVP-OPM rules.

3. With the certificate verified, the drivers open a verified, secure channel called an OMAC (One-Key CBC [Cipher Block Chaining] MAC [Message Authentication Code]). Through this channel there's immediate notification of any interference tampering with the digital stream. Via the verified channel, the graphics driver reports on the attributes of the graphics hardware, determining which outputs need to be disabled or enabled. The graphics driver also determines whether a UAB is present. If present, PVP-UAB takes control, ensuring through encryption and complex authentication mechanisms that no content is copied or stolen via the bus.



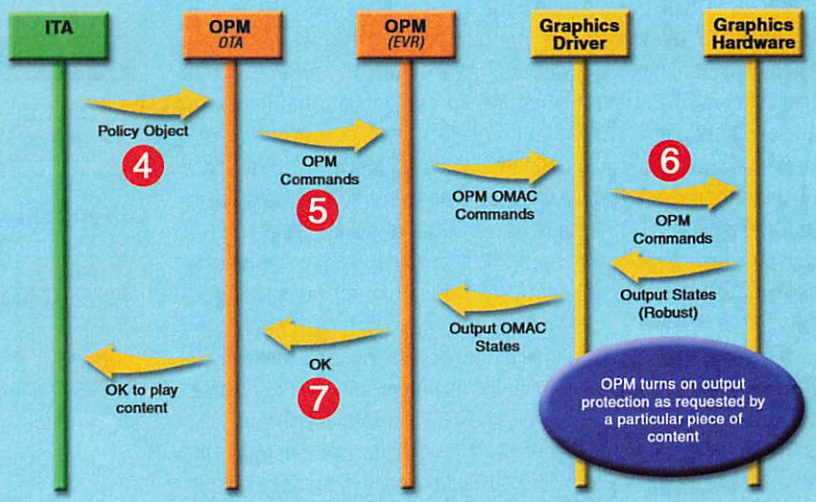
. . . Play Content With PVP-OPM

4. The device is now ready to play content. The content contains an ITA (Input Trust Authority), which passes DRM policies about the content to the OPM OTA (Output Trust Authority).

5. The OPM OTA creates a set of commands for the output based on the content's policies and protection mechanisms available with the output device. If it must play the content at a lower resolution because of the lack of necessary protection mechanisms available in the hardware (called a resolution constriction), the OPM OTA sends its commands to the OPM EVR (Enhanced Video Renderer).

6. The OPM commands move to the graphics driver and hardware, which finalizes the requests for the necessary protection and disables unprotected outputs. The graphics hardware drivers must guarantee the protection of these messages, preventing hackers from gaining access to these streams.

7. Finally, the PVP-OPM compares the output information that the graphics driver provides with the output information the content's ITA requested. If everything matches, the PVP-OPM lets the premium HD video play.



Source: Microsoft

A History Of Video DRM

DRM technologies grew out of the need and desire to protect copyrighted content. In the days before data was digitized, making copies of copyrighted content often was difficult or costly and almost always resulted in a loss of quality. However, once data was digitized, making perfect copies of that data was easy and inexpensive and resulted in almost no data loss.

Soon DRM technologies entered the picture to manage the rights of those who use this content. DRM is a form of mandatory access control, in that the computer system or content playback device is asked to enforce the rules set by a remote administrator. However, DRM technologies have yet to provide the perfect balance of protecting content while giving customers easy-to-use access to and "fair use" of the content.

Here are some milestones regarding DRM and the prevention of copying video content.

1985 VHS videocassettes get Macrovision, a video copy prevention scheme that hinders people from making copies of the content on the tapes. (Macrovision also is the name of the company that developed this scheme.)

1994 IBM introduces its idea of DRM technology.

1994 DirecTV launches satellite TV service using smart cards.

1996 The CSS (Content Scrambling System) debuts on some DVDs, making use of a 40-bit encryption algorithm to protect content and enforce region coding. However, a reverse engineering of CSS, called DeCSS, breaks the algorithm in 1999.

1997 Because of hacking problems, DirecTV finishes replacing its first version of smart access cards.

1998 Congress passes the DMCA (Digital Millennium Copyright Act), outlawing the dissemination of technology that works around copyright protection technologies.

1999 DVDs get Macrovision protection.

2003 Apple launches a DRM system called FairPlay. Microsoft also launches its own WRMS (Windows Rights Management System).

2004 The European Union passes the EUCD (EU Copyright Directive), which is similar to the DMCA. Real Networks introduces a DRM system called Helix. HBO begins using CGMS-A (Content Generation Management System for Analog), designed to prevent consumers from making copies of on-demand programming.

2005 Macrovision introduces RipGuard technology, which is designed to prevent individuals from using ripping software to copy a DVD.

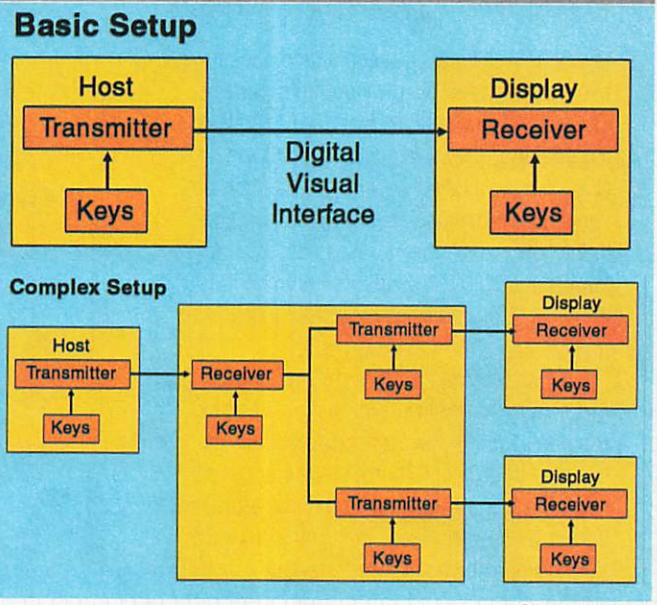
Sources: Wikipedia, The Digital Rights Management Home Page, Espoo-Vantaa Institute of Technology, Msmvps.com

Utilize HDCP

Under HDCP each display device must meet the HDCP requirements to accept the protected HD video content. At each step in the process of moving the content among hardware devices (including transmitters, receivers, and repeaters), HDCP oversees the matching of an encryption key to authenticate the hardware and ensure it meets HDCP requirements.

When a company manufactures a display device, it contains a unique, permanent 40-bit KSV (Key Selection Vector) that's baked into the device. HDCP makes use of a list of devices, called SRM (System Renewability Message), to determine whether a device is allowed to play content. The SRM lists often appear in the root directory of a DVD.

If individuals hack certain keys, developers can add them to the SRM list. This is the biggest potential roadblock to hackers hoping to come up with a solution to give non-HDCP devices and displays the ability to work with HDCP content. If developers can determine the 40-bit key that allows a hack, they can add the key to the SRM list. ▲



Source: Microsoft

must build support for HDCP into their OSes. Without such support, end users wouldn't be able to play the content on their computers in the future.

That doesn't mean end users are excited about Microsoft implementing HDCP into Windows Vista. For instance, you don't have to search much on the Web to find blogs and message boards that strongly criticize Microsoft's decision. Critics say that without Microsoft's support, HDCP might fade away. And without HDCP, end users in the future won't have to purchase new displays that are HDCP compatible.

However, from Microsoft's point of view, if and when HDCP becomes commonplace, the company wants to make sure Vista will work with it. If the content providers place HDCP restrictions on all HD video content (as it seems they will), and if Microsoft decides not to include support for HDCP in Vista, end users would be unable to play the content and might criticize Microsoft much more.

Will It Work?

Cynics say it doesn't matter what type of content protection HD video will use; someone will successfully hack it. Most types of current DRM technology have already been hacked very quickly. However, thus far HDCP appears to be the most sophisticated DRM technology ever created. And maybe it will be the unbreakable one, too. We will just have to wait and see. ▲

by Kyle Schurman

A History Of Displays

When we think about the history of displays, it's easy to focus on the high-tech screens of today such as plasma TVs and LCD computer monitors. But who was the first person to use a light source to display a shadow puppet on a wall? Well, we don't know. But we'll bet it was an amazing display at the time.

Every time individuals came up with new ideas for displaying and projecting images, they helped advance ideas about displays. (OK, the time your grandparents hung a bed sheet on the wall to show you six hours of their vacation slides probably *didn't* take display technology forward much. But you get the idea.) Here are some of the interesting advancements in the long history of displays.

350 B.C. Aristotle watches an eclipse beamed onto the ground via a sieve.

1671 Athanasius Kircher projects images painted on glass plates using light from an oil lamp.

1861 The Kinematoscope is invented (linked images on glass plates rotate through the device).

1885 Paul Gottlieb Nipkow patents the first electromechanical TV system; it's not workable until 1907.

1891 Thomas Edison patents the idea for the Kinetoscopic camera, which records moving pictures on a strip of film. A lighted box displays the film's images, eventually called nickelodeons.

1897 Karl Ferdinand Braun invents the CRT.

1922 The first commercially produced CRTs appear; this product will be the dominant technology in TVs and computer monitors for several decades.

1926 The first moving image appears on an electromechanical TV in London.

1934 Philo Taylor Farnsworth demonstrates what most people consider the first all-electronic TV in Philadelphia.

1940 RCA demonstrates the first color TV.

1941 NBC, owned by RCA, conducts the first field test of a color TV broadcast, but the over-the-air feed didn't work on black-and-white TVs (no consumers owned color TVs at the time).

1964 Donald L. Bitzer and H. Gene Slottow at the University of Illinois develop monochrome plasma display panels. High costs, compared to CRTs, inhibit their usage.

1968 RCA demonstrates the first LCD. The LCD's quality is poor, but an improved design appears in 1971 and is more similar to today's LCDs.

1979 Japan designs the first working HDTV system.

1995 The University of Illinois introduces a color plasma display.

1998 The first HDTV sets become available in the United States; HDTV broadcasts also begin.

Source: Wikipedia

Find HDCP Displays

If we look into the future, the process of obtaining HD content could potentially be problematic for people depending on the display hardware they own.

1. Let's say you plan to purchase a new HD monitor tomorrow for a few thousand dollars.

2. Later on, after Microsoft releases its Windows Vista OS, you purchase a new computer to pair with your HD monitor. You probably already know that Windows Vista will include support for HDCP and other copyright protection features. These protection features will completely control if and what type of content is sent to the display. However, you're sure that your HD monitor will work with HDCP; after all, you spent a lot of money on it.

3. You prepare to run HD content . . .

   a) . . . and it runs perfectly. HD content is amazingly clear and sharp. You had enough foresight, or were lucky enough, to make sure your monitor supported HDCP. No worries for you.

   b) . . . and it runs, but you don't see anything special. The HD content looks exactly the same as what you saw on your previous monitor. In fact, upon closer inspection, it doesn't look as sharp as what you had in the past.

   The content provider has chosen to let displays that don't support HDCP still show HD content, but they must show it at a far lower resolution. A constrictor reduces the resolution (see the "Make Use Of Resolution Constriction" sidebar) resulting in fuzzy images. Because of the process the constrictor uses, the images likely will end up not as sharp as on a standard monitor.

   c) . . . and nothing happens other than you stare at a black screen or you receive an error message that says, No HDCP Support Available.

   The content provider has chosen to make HD content inaccessible to any display device that doesn't support HDCP. The bad news with this option? Even those who don't have devices capable of running HD will be unable to access the HD content at a lower resolution.

If 3b or 3c happens to you, you might want to have your family swear jar handy because you're probably going to be filling it after reading the next two sentences. If you purchase a new display device before 2006, there's a good chance it will not support HDCP. So, you will most likely have to pay for a new monitor that supports HDCP.

Luckily, it's not the future yet. Although our crystal ball doesn't tell us exactly when Windows Vista, HD content, or HDCP-capable monitors will be ready to work together, they're on the way. If you don't want to miss out on these technologies, you may want to wait to purchase a display device until you know it includes HDCP. ▲

Windows Vista, shown here in beta version, will support HDCP and content protection for HD video.

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THE ULTIMATE PC HARDWARE HOLIDAY GIFT GUIDE

We Build & Test A Holiday Dream PC For 2005

64 GIFTS FOR GADGET LOVERS

Have You Been A Naughty Or Nice Little Gearhead?

It's that time of year again. The days are getting shorter, the air is getting colder, and all of us are on our best behavior in the hopes that the big guy in red will put us on the coveted Nice list. Folks on the Naughty list don't get $600 video cards or $1,000 processors, ya know, and he does check his list twice. Eh, who are we kidding? Even if we left Santa a filet mignon and a bottle of Dom, the odds of him leaving the parts for a dream PC under our tree are only slightly better than Tommy Lee's chances of earning a college degree.

That puts the onus squarely on your shoulders. Assembling a dream PC will require arduous research, careful consideration, and a super-fat wallet. Luckily, the holidays are almost here, so you may be able to charm your loved ones into giving you a couple of dream PC components as gifts. It's the least they could do after the year of free tech support you've given them since the last holiday season. But what should you ask for? Which products deserve your attention? Well, we're here to help you out. We've built and benchmarked a brand new dream PC for 2005 and detailed why we picked each component. We've also put together a handy wish list that will help you and your loved ones find the parts for your very own dream PC a whole lot more easily.

Processor

AMD Athlon 64 X2 4800+
($899 • www.amd.com)

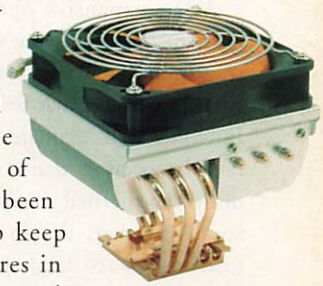
Choosing the right processor for a dream PC is not as cut and dried as you might think. There are a multitude of things to consider, beginning with how you plan to use your new PC. Hardcore gamers may opt for the highest-clocked single-core processor they can afford, while content creation specialists who multitask with numerous CPU-intensive applications will benefit most from a fast dual-core processor. Traditional single-core processors are great at running a single thread quickly, but a dual-core CPU can handle two (or more) threads simultaneously and do twice the work at similar clock speeds. Dual-core processors also make for a smoother overall computing experience, as they are less prone to the lag or slowdowns caused by multiple applications vying for precious CPU resources. Most single-core processors are less expensive than their dual-core counterparts, however, and the majority of them draw less power and put out less heat, as well.

As 2005 draws to a close and more information about Microsoft's next operating system becomes available, we're finding it increasingly difficult to justify the purchase of a single-core CPU. Selecting a dual-core processor for your dream PC will ensure a longer viable lifespan and better performance when multiple applications are running on your system. For our endeavor we chose AMD's current flagship dual-core processor, the Athlon 64 X2 4800+. The 4800+ uses AMD's 0.09-micron SOI process and comprises two 2.4GHz execution cores, each with 1MB of L2 cache. Recent testing of the 4800+ revealed huge performance advantages over similarly clocked single-core Athlon 64 processors, with the largest gains coming from encoding and rendering applications. Another plus is that the Athlon 64 4800+ will function in virtually all socket 939 motherboards, which gave us a lot of freedom to choose the best mobo for our dream PC.

If we would've gone with an Intel-based system for our 2005 dream PC, the Pentium Extreme Edition 840 would have been a viable alternative to the Athlon 64 X2 4800+. The Pentium Extreme Edition 840 ($999) is equipped with two 3.2GHz execution cores that use Hyper-Threading technology. This means that the Pentium Extreme Edition can process up to four individual threads simultaneously (two threads per core), which makes it adept at multitasking. Another alternative to the high-priced Athlon 64 X2 4800+ would be the lower-clocked Athlon 64 X2 3800+ ($359). The two execution cores at the heart of the Athlon 64 X2 3800+ are clocked at only 2GHz and feature half the L2 cache of the 4800+ (512KB per core); however, the Athlon 64 X2 3800+ still proved itself an excellent overclocker and a capable performer. Furthermore, at less than 40% of the cost of an Athlon 64 X2 4800+, the Athlon 64 3800+ is definitely the budget dual-core CPU of choice.

Heatsink & Cooling

Thermaltake Big Typhoon CL-P0114
($49 • www.thermaltake.com)



For a processor to function reliably for extended periods of time, its temperature has to remain within certain opertional limits. Over the years a multitude of products have been released to help keep CPU temperatures in check, such as watercooling and vapor phase-change kits, but thankfully these kits aren't necessary for a dream PC just yet. For a time there was concern that dual-core processors would create so much heat that traditional air-cooling would no longer suffice. But AMD and Intel made revisions to their processor cores and tweaked their manufacturing lines, and these moves have lowered the maximum thermal power of their processors. For example, AMD's dual-core Athlon 64 X2 4800+'s max thermal power is to the point that it's only 6 watts

higher than the single-core FX-57 (110W vs. 104W).

Because our dream PC is built around AMD's relatively cool-running Athlon 64 X2 4800+, a good heatsink and fan combo would suffice for our processor cooling needs. Had we planned on building the ultimate overclocking rig, our choice would likely have been different, but for our dream PC, aircooling was a good fit. But, we're still all about high-performance, and so only the beefiest CPU cooler would do. In addition, our cooler of choice would have to be quiet because the headache-inducing noise that some air coolers produce isn't conducive to getting any work done. We ended up choosing Thermaltake's massive Big Typhoon. The Big Typhoon sports two independent banks of heatpipes that funnel heat from the hefty copper base into two large, thin-finned aluminum heatsinks. A near-silent 120mm fan, rated at 16dB, is mounted on the top of the Big Typhoon to circulate air through the heatsinks' fins and dissipate heat. The overall design of the Thermaltake Big Typhoon makes it one of the most capable aircoolers out there and the best candidate for our 2005 holiday dream PC.

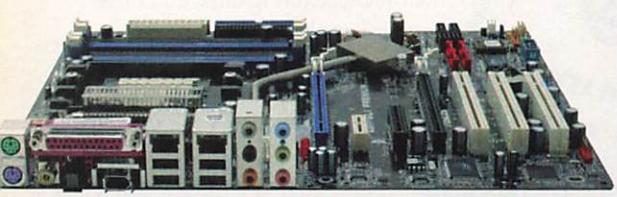
A less expensive option would have been to stick with the stock cooler that was included with our processor, but what fun would that be? Both AMD and Intel included adequate coolers with their boxed processors that are capable of handling the thermal needs of their processors; however, this is a custom build geared toward high performance, so skimping on any one part would only take away from our finished product.

Motherboard

Asus A8N SLI Premium
($175 • www.asus.com)

Selecting the right home for our Athlon 64 X2 4800+ processor was relatively easy. We've been exposed to a plethora of socket 939 motherboards over the past year, but few have impressed us as much as Asus' A8N SLI Premium. The A8N SLI Premium supplants the A8N SLI Deluxe as Asus' flagship motherboard for AMD's socket 939 desktop processors, although a newer board based on the nForce4 SLIX16 is already in the works. Nvidia's extremely popular nForce4 SLI chipset powers the A8N SLI Premium, but different from virtually every other SLI mobo for AMD processors, the A8N SLI Premium doesn't require users to change the orientation of the transposer card to alter the PCI Express lane configuration for single-card or SLI operation. The A8N SLI Premium also has a slick heatsink/heatpipe assembly that silently wisps heat away from the chipset and VRM. Additionally, the A8N SLI Premium has a bevy of integrated components, including onboard 8-channel audio, dual gigabit LAN controllers, FireWire, and dual RAID controllers. This board is also great for overclocking and has a system BIOS that's loaded with all of the tools enthusiasts look for to tweak their rigs.

Our choice of motherboard obviously would've been different if we had selected an Intel processor for our 2005 dream PC. We like the MSI P4N Diamond for Intel processors because it shares many similarities with the Asus A8N SLI Premium. The MSI P4N Diamond ($219) for LGA775 Intel processors is based on Nvidia's nForce4 SLI Intel Edition chipset and has solid-state switches for easy configuration of the board's PCI-E lane configuration. MSI's P4N Diamond motherboard has an impressive list of features, as well, which include Creative Labs Sound Blaster Live 24-bit 7.1-channel audio, dual gigabit LAN, FireWire, and support for RAID (0, 1, 0+1, 5).



Memory

Corsair XMS CMX1024-4400PRO (2GB [1GB x 2] TWIN22048-4400PRO DDR Memory Kit)
($350 • www.corsairmicro.com)

We had a few requirements for the RAM we would install in our 2005 dream PC. First, it needed to come in matched pairs to exploit our X2's 128-bit wide memory controller. The RAM also had to be highly overclockable, have a large capacity, and it needed to add some bling to the build, too. With these requirements in mind, we began our search for the perfect memory for our dream PC and came across Corsair's outstanding XMS CMX1024-4400PRO 2GB (1GB x 2) DDR memory kit. The Corsair XMS CMX1024-4400PRO 2GB memory kit is composed of two 1GB sticks of DDR RAM that are capable of running at an excess of 550MHz with 3-4-4-8 timings. And each stick is adorned with 18 activity LEDs that rapidly blink to show the level of memory activity, much like the sound meters found on some audio equipment.

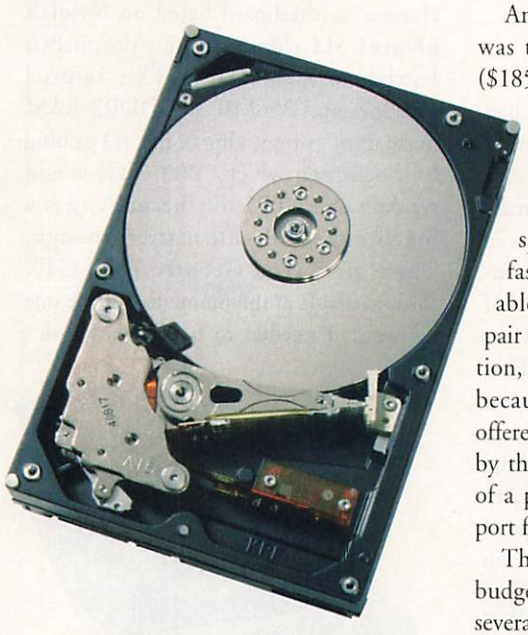
We also toyed with the idea of installing two of Corsair's XMS CMX-1024-4400PRO 2GB kits in our dream PC, but we found that even though the system had a whopping 4GB of RAM, overall system performance was slightly lower in most benchmarks because we could no longer

run the system with a 1T command rate with four sticks installed. Yes, 4GB of RAM would have been sweet, but 2GB is plenty for now.

Conversely, a system powered by any of Intel's current LGA775 Pentium processors would require a totally different type of RAM. The chipsets for today's high-end Pentium processors require DDR2 RAM, as opposed to the DDR1 RAM necessary for Athlon processors. We also looked to Corsair for a quality DDR2 memory kit memory and were taken by its XMS2 1GB (2 x 512MB) 240-pin TWIN2X1024A-5400UL kit ($300). The Corsair XMS2 TWIN2X1024A-5400UL kit is capable of running at DDR675 speeds (PC2 5400) with very tight timings for a DDR2 kit. Furthermore, this kit is capable of running at 3-2-2-4 timings, which is first-rate considering most other DDR2 memory kits run at 4-4-4-12.

Storage

Hitachi Deskstar 7K500 (500GB Hard Drive)
($350 • www.hitachigst.com)



If you rummage through a power user's hard drive, you're likely to find that the data on his drive is actually more valuable than the system the drive is installed in. With thousands of dollars of data in the form of music, movies, images, and applications stored on a typical power user's PC, choosing the right hard drive is of the utmost importance. Our dream PC's hard drive had to be reliable, store massive amounts of data, and it had to be as fast as possible. After hours of research and testing, we decided a pair of Hitachi's Deskstar 7K500 drives would suit our needs without doubt.

We love the Deskstar 7K500 for a few reasons, namely its support for NCQ, gargantuan 500GB capacity, 16MB of cache, and SATA 3Gbps connectivity, among other things. The Hitachi Deskstar 7K500 packs its data onto five 100GB platters, spinning at 7,200rpm, and has an impressive list of specifications that include a 102MBps internal data transfer rate, a sustained data transfer rate of almost 65MBps, 8.5ms seek times, and a 4.17ms average rotational latency. The drive is also backed by a three-year warranty, which is respectable considering that other companies have recently begun offering only a one-year warranty on their hard drives.

Another contender for our dream PC was the 74GB Western Digital Raptor ($185). Yes, the Raptor's storage capacity is miniscule by today's standards, and it seems almost laughable next to the Deskstar 7K500's half a terabyte, but the drive's 10,000rpm spindle speed makes it arguably the fastest single SATA hard drive available. We thought about linking up a pair of Raptors in a RAID 0 configuration, but opted for the Deskstar instead because the modest performance gains offered by the Raptors were overshadowed by the titanic increase in storage capacity of a pair of 7K500s and the drives' support for NCQ.

Those of you on a more conservative budget shouldn't fret though. There are several other hard drives available that are worthy of consideration and won't break the bank. They may not have the capacity or performance of a drive such as the Hitachi 7K500, but they're still viable alternatives. One such drive is the Maxtor DiamondMax 10 6L200S0 ($95). This drive has a fairly large 200GB capacity, 7,200rpm spindle speeds, 16MB of cache, and NCQ support. And perhaps best of all, it's available for less than $100 at most online retailers.

Optical Drive

Plextor PX-716SA SATA DVD Burner
($125 • www.plextor.com)

Our optical drive of choice may be a bit of a surprise to some of you. The brand won't raise any eyebrows, as Plextor's reputation in the optical drive market has reached almost legendary status, but the model we chose may seem strange. For our 2005 dream PC, we went with Plextor's PX-716SA SATA DVD burner. Even though the PX-740A is a newer ($80) optical drive, which can burn dual-layer media a little faster, and its naming convention implies that it's somehow a higher-end product, the PX-716SA is actually a more capable drive.

Particularly, we like the PX-716SA because it uses the SATA interface on our nForce4 SLI motherboard in lieu of the legacy PATA interface. The Plextor PX-716SA also has a large 8MB buffer, which makes it less prone to buffer underrun type errors and has a peak transfer rate of 66MBps. The drive is capable of burning DVD±R media at 16X, dual-layer DVD media at 6X (thanks to a recent firmware update), and CD-Rs at 48X and supports all of Plextor's proprietary technologies, such as Intelligent Tilt, PoweRec, GigaRec, Q-Check, SecureRecording, and VariRec. Another perk is that the PX-716SA ships with both beige and black bezels. All things considered, the Plextor PX-716SA is a superb optical drive. It may not be the best in any one category, but its overall feature set is second to none.

If you want to save a few bucks on an optical drive for your own dream PC, we suggest considering Lite-On's SOHW-1693S ($43). Lite-On has earned a reputation for building very capable optical drives that are easy on the wallet. The SOHW-1693S has a 2MB buffer and can burn DVD±R media at 16X, dual-layer DVD media at 4X, and CD-Rs at 48X. But unlike the Plextor PX-716SA, the Lite-On drive connects to a system via a parallel ATA interface.

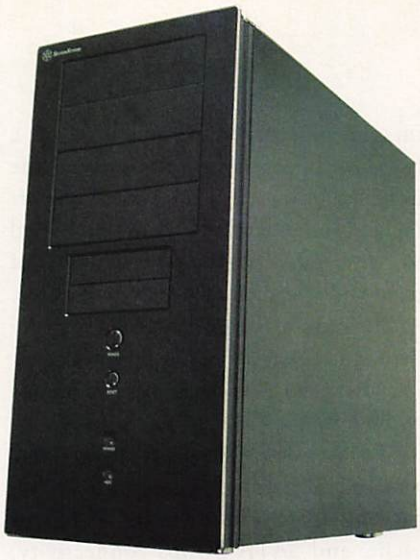
Power Supply

Thermaltake Silent PurePower W0049 680W PSU
($159 • www.thermaltake.com)

All of the parts in a high-performance PC have one thing in common: Every single one of them requires a constant, clean supply of power to function properly and operate reliably. We're not going to patronize you by repeating the cliché that a PSU is the most commonly overlooked part of a PC because as *CPU* readers we expect you to know that already. The bottom line is that you need to choose a power supply that's capable of serving up all of the juice necessary to breathe life

into your PC. As far as we're concerned, the more capable the PSU, the better.

For our 2005 dream PC, we once again turned to the folks at Thermaltake. The company's Silent PurePower W0049 680-watt power supply unit strikes a very good balance among features, performance, and price. At about $159 online, the Silent PurePower W0049 is a bit more expensive than many lighter-duty PSUs, but the only other PSU that compares to the W0049 is PC Power & Cooling's Turbo-Cool 850



SSI, which almost triples the price ($430). The Silent PurePower W0049's features include a mirrored finish, a +5V rail capable of supplying up to 50A of current, sheathed, and color coded cables; dual fans; and a smorgasbord of power connectors, including two 6-pin PCI-E connectors. We could suggest a couple of less expensive options, but in our opinion, it's not worth it. Saving $40 or $50 on a lesser PSU is not a smart thing to do. Go big and rest easy.

Enclosure

SilverStone Temjin TJ04 ATX Case
($99 • www.silverstonetek.com)

The case for our 2005 dream PC had to meet certain criteria before it could even be considered. *CPU*'s dream PC case needed an enclosure with 120mm intake and exhaust fans, a high-quality finish, a side-panel window, front-mounted connectors, toolless assembly, and plenty of internal room for components. After some intense searching, we chose SilverStone's Temjin TJ04. It's not the newest case on the market, but its design and features were exactly what we were looking for. The TJ04 has a high-gloss finish, an aluminum front bezel, and an optional square side-panel window. At the bottom of the front of the case are USB, FireWire, and audio connectors, and the dual intake and exhaust fans just happened to be 120mm each. We also liked that the Temjin TJ04 wasn't extremely expensive, its toolless assembly, and, it just looks plain cool. There's a reason Falcon Northwest is using this case for its Talon systems: It's a great product.

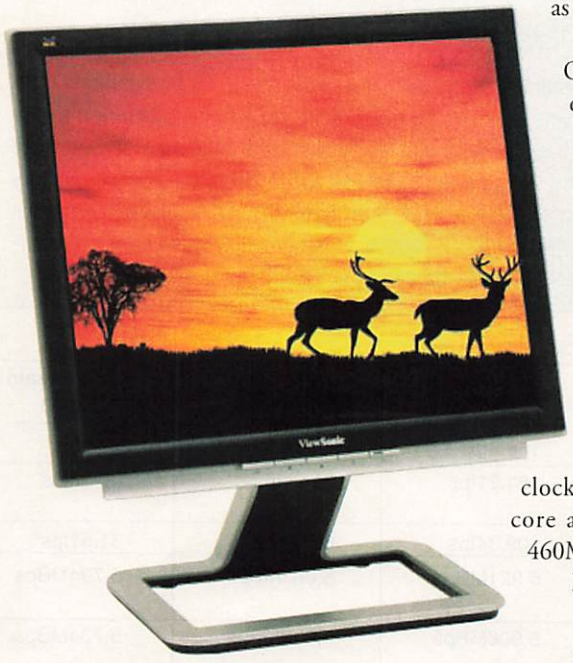
Another case we considered was the Cooler Master Centurion 5 CAC-T05-UW ($49). This is the case we used for our recent "Silent But Deadly" project. (See the August *CPU* page 33 and September *CPU* page 31.) Its front bezel allows for tremendous airflow into the case, and it has an attractive side-panel window. But the smallish 80mm intake fan wasn't what we wanted for this project, and we prefer the TJ04's four front-mounted USB ports over the Centurion's two.

Video Card

BFG GeForce 7800 GTX OC
($549 • www.bfgtech.com)

We had a relatively easy time selecting the video cards we wanted to use in our 2005 dream PC. Unfortunately for ATI, its next-gen products based on the GPU code-named R520 have yet to materialize, and there wasn't any reliable performance information as of press time, so Nvidia's GeForce 7800 GTX was our only option. Nonetheless, we were leaning toward the GeForce 7800 GTX anyway because we chose a motherboard based on Nvidia's nForce4 SLI chipset for our dream PC. Furthermore, the 7800 GTX's 24-pixel pipelines and 256MB of GDDR3 RAM make it the current king of the 3D gaming hill. Selecting which 7800 GTX would reside within 2005 the dream PC was a much more difficult matter, though. There are several GeForce 7800 GTX cards available at the moment, but the one we wanted needed to have a single-slot

they also encroached on the expansion slots, so we took the Extreme N7800GTX Top cards out of the running. MSI's NX-7800GTXs ($465) are single-slot and inexpensive, but their GPUs are clocked at Nvidia's reference spec of 430MHz, so we scrapped those, as well.



BFG's GeForce 7800 GTX OC, however, completely fit our dream PC. The BFG GeForce 7800 GTX OC has a lifetime warranty, a single-slot cooler, and it ships with a great bundle that includes NVDVD 2.0 multimedia player, VideoStudio 7 SE, GameDrive 9, and a full version of Far Cry. And, as its name implies, the BFG GeForce 7800 GTX OC comes overclocked right out of the box. Its core and memory are clocked at 460MHz and 1.3GHz, respectively, making it one of the faster GeForce 7800 GTX cards available right now. Two of these babies running in SLI mode were completely suitable for this year's dream PC.

Although it wasn't what we needed for our project, multimedia fans looking for an all-encompassing 3D/TV tuner/video card will likely find satisfaction with one of ATI's All-In-Wonder Radeon cards. We like the All-In-Wonder Radeon X800 XL ($399) in particular. It's ATI's current top-of-the-line PCI-E-based All-In-Wonder card and features a 16-pipeline Radeon X800 XL GPU, 256MB of GDDR3 RAM, and all of the video-related features the All-In-Wonder line of products are known for. The All-In-Wonder Radeon X800 XL offers very good 3D performance, S-Video and composite inputs and outputs, TV and FM tuners, and a wireless remote control. The card also ships with a bevy of software to exploit its multimedia capabilities.

cooler, and have a decent bundle, and it had to be overclocked out of the box.

We considered a pair of Asus' Extreme N7800GTX Top cards ($570), but their dual-slot coolers obstructed the use of a few of our mobo's ports and headers, and

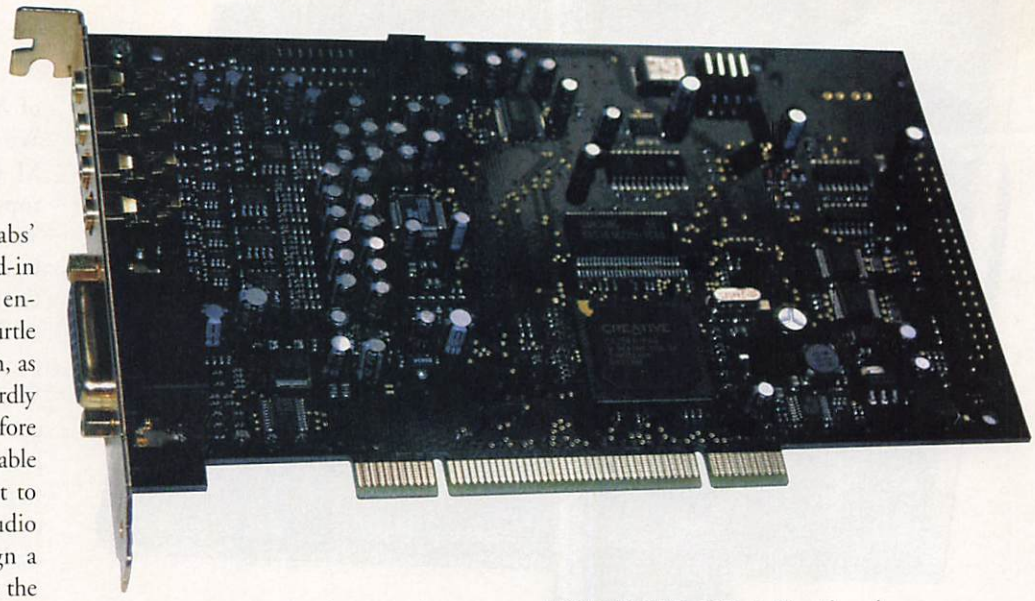
Display

Dell UltraSharp 2405FPW 24-inch Wide Aspect Flat Panel LCD Monitor

($1,199 • www.dell.com)

Deciding which monitor to use with our dream PC wasn't too difficult. We wanted a wide aspect, flat-panel LCD monitor with a ton of screen real estate and a good response time. We couldn't go completely insane and order up anything too gargantuan, so something in the 21- to 24-inch range would have to suffice. After evaluating a few 24-inch widescreen LCDs, we picked Dell's exceptional UltraSharp 2405FPW. The UltraSharp 2405FPW features a 12ms gray-to-gray pixel response time and has a gorgeous 1,920 x 1,200 native resolution. This display also has a built in USB hub, integrated card reader, and includes a height-adjustable stand. We also like the fact that the 2405FPW is equipped with DB15, DVI, S-Video, and component inputs. And believe it or not, the UltraSharp 2405FPW is one of the least expensive flat panels in its market segment.

If you don't need a monstrous 24-inch flat panel, there are several alternatives available, including ViewSonic's 19-inch VX924. We like the VX924 because of its extraordinary 3ms gray-to-gray (average) and 6ms white-black-white pixel response time and fantastic price. Although it's one of the more impressive 19-inch panels available, the ViewSonic is nevertheless priced at an affordable $379.



Sound Card

Creative Labs X-Fi

($129 to $399 • us.creative.com)

For the past few years Creative Labs' Audigy 2 products have been the add-in sound cards of choice for many PC enthusiasts. A couple of products from Turtle Beach and M-Audio got some attention, as well, but Creative's dominance has hardly been challenged. But all of this was before motherboards began shipping with capable onboard audio controllers. In an effort to thwart the onslaught of integrated audio controllers, Creative set out to design a new line of products that clearly define the reason for spending the extra money on add-in soundcards. The end result is the Sound Blaster X-Fi.

Creative Labs recently released four products in its new X-Fi lineup: the Elite Pro, $399; Fatal1ty FPS, $279; Platinum, $199; and Xtreme Music, $129. Each card is powered by the new X-Fi Xtreme Fidelity audio processor, which is composed of more than 51 million transistors capable of 10,000 MIPS. That makes the X-Fi 24 times more powerful than its predecessor, the Sound Blaster Audigy 2 ZS. X-Fi-based sound cards feature 136dB SNR processing quality, 128-voice support, EAX MacroFX, EAX PurePath, and Environment FlexiFX (EAX ADVANCED HD 5.0). Also, because more audio processes are offloaded from the CPU and handled by the X-Fi processor, CPU utilization is minimal. All of these features, in addition to the card's 24-bit Crystalizer technology for superior sound quality, make the Creative Labs X-Fi line of sound cards the pinnacle of PC audio.

Dream PC 2005: Extreme Performance

Most of the high-end hardware on our 2005 wish list commands a premium price. But do you really get what you pay for? What kind of performance can you realistically expect from a system built with all of the flagship products on our wish list? Well, we're going to show you. We've put together such a system and can say that if you read last year's wish list but waited an extra year to upgrade, you made a good choice. *CPU*'s 2005 dream PC is a screamer.

We took the 2005 dream PC to task with the same group of benchmarks we used last year to see how our new behemoth performed when pitted against 2004's hottest technology. We threw the results from our 2003 dream PC in for reference, as well. For all of our in-game benchmarks, we set the resolution to 1,600 x 1,200 to heavily stress the graphics subsystem. Doom 3 was set to its Ultra Quality mode, and all of Far Cry's in-game graphical options were set to the maximum values. For the Counter Strike: Source VST (Video Stress Test), not only was the resolution cranked up, but 4X antialiasing and 8X anisotropic filtering were enabled, as well.

Our 2005 dream PC tore through all of the in-game benchmarks, besting last year's dream PC by significant margins in every test. On the other hand, SiSoftware's Sandra memory bandwidth benchmark tells somewhat of a different story. Because both of the cores on the Athlon 64 X2 4800+ share a single memory controller, there is a slight drop in performance. Nevertheless, the minuscule differences Sandra reported probably won't have a measurable impact on real-world performance. ▲

Holiday Numbers

	CPU Dream PC 2005	*CPU* Dream PC 2004	*CPU* Dream PC 2003
Doom 3	168.3fps	70.3fps	19.6fps
Counter Strike: Source VST	151.21fps	65.91fps	33.96fps
Far Cry	109.34fps	65.02fps	31.51fps
SiSoftware Sandra 2004: Integer Bandwidth	5,921MBps	6,067MBps	5,794MBps
SiSoftware Sandra 2004: Floating Point Bandwidth	5,906MBps	6,059MBps	5,734MBps

System Specifications

CPU Dream PC 2005	*CPU* Dream PC 2004	*CPU* Dream PC 2003
Athlon 64 X2 4800+	Athlon 64 FX-55 (2.6GHz)	Athlon 64 FX-51 (2.2GHz)
Asus A8N SLI Premium Motherboard	nForce4 Ultra Motherboard	Asus SK8V K8T800 Motherboard
2GB Corsair DDR550 RAM	1GB Corsair DDR400 RAM	1GB Corsair DDR400
2 GeForce 7800 GTX(PCI-E)	GeForce 6800 Ultra (PCI-E)	ATI Radeon 9800 XT (AGP)

Speakers & Headphones

Logitech Z5500 Digital
($279 • www.logitech.com)

Recommending PC audio equipment, such as speakers or headphones, is difficult because of the subjective nature of each product's performance. What sounds great to one listener may sound horrible to another. And, there is that large contingent of enthusiasts who would much rather connect their PCs to an existing entertainment system for the utmost in quality. Despite all of this, there are a couple of PC audio products that we feel have an almost universal appeal.

For instance, Logitech's Z-5500 Digital 5.1 channel speaker system is THX certified and features Dolby Digital & DTS hardware decoding, 500 watts of RMS power, Logitech's Digital SoundTouch Control Center for easy configuration, and a handy remote control. The speaker system's large 10-inch, long-throw subwoofer has a flared bass port and delivers 188 watts of thumping bass. Even though they only have a single driver, the satellite speakers and center channel feature polished aluminum phase-plug drivers that combine the clarity of a tweeter with the fullness of a separate midrange. In subjective listening tests, we found Logitech's Z-5500 Digital speaker system to be among the best we have heard in the realm of PC audio.

If you don't have enough room for a multichannel speaker system but still want to enjoy the benefits of such a setup, we suggest Zalman's ZM-RS6F Surround Sound Headphones ($49). Although they look much like a standard set of over-the-ear headphones, the ZM-RS6F Surround Sound Headphones simulate the effects of multichannel speaker system by separating front, rear, and center audio channels.

Input Devices

Logitech Cordless Desktop MX 3100
($99 • www.logitech.com)

Even if they have little effect on the overall performance of a system, choosing the right keyboard and mouse were still important to the final assembly of our 2005 dream PC. The fact of the matter is, of every piece of hardware used to build a dream PC, you're likely to interact the most with your keyboard and mouse. Furthermore, no matter how fast or powerful your rig is, subpar input devices can ruin your experience.

For our dream PC, we chose Logitech's Cordless Desktop MX 3100. The MX 3100 kit features an ultra-flat Zero Degree Tilt keyboard with a complete array of programmable one-touch function keys and other ergonomic design aspects for an increased comfort level. The keyboard also features navigation controls, so users can scroll up or down or left or right with either hand. To complement the keyboard, Logitech includes its popular MX 1000 cordless laser mouse. The rechargeable, MX 1000 laser mouse has a much higher resolution than most other cordless mice and features a tilting scroll wheel for multidirectional scrolling.

Wrap It Up

Looking back over our guide of 2005's hot holiday hardware, we hope we've given you a good idea as to what it takes to put together a holiday dream PC. The end result of combining our top picks is a powerful PC that's ready for any application 2006 will have to offer. Now, if you'll excuse us, we're off to the market for a filet and a bottle of Dom.

by Marco Chiappetta

CPU's Holiday Hardware Shopping List

Few things are more disheartening than leaving a crucial holiday hardware purchase up to a loved one, only to find that he or she has come home with the wrong product. Yes, it's the thought that counts, but it just plain stinks when you think that shiny package sitting under the tree is a GeForce 7800 GTX card and then you unwrap it to find out that it's actually a GeForce FX 5200. Bummer. So much for a fun-filled night of antialiased, anisotropic filtered, high-resolution fragging with all of your favorite game's eye-candy-enhancing features turned on.

So, if you don't want to find yourself in this situation, do yourself a favor and rip out our holiday hardware shopping list, make a couple of copies, and place them in strategic locations where your family and friends are sure to find them. Just make sure you check off the items you need first. You'll be glad you did.

A Potent Processor

- AMD Athlon 64 X2 4800+, $899
- Intel Pentium Extreme Edition 840, $999
- AMD Athlon 64 X2 3800+, $359

Your Competent Cooler

- Thermaltake Big Typhoon CL-P0114 120mm Cooling Fan/Heatsink, $50
- Stock CPU Cooling Fan/Heatsink, $0 (Just be sure to buy a boxed processor.)

The Magnificent Motherboard

- Asus A8N SLI Premium (Socket 939, nForce4 SLI chipset), $175
- MSI P4N Diamond (Socket T, nForce4 SLI Intel Edition), $219

Majestic Memory

- Corsair XMS CMX1024-4400PRO 2GB (1GB x2) DDR Memory Kit, $350
- Corsair XMS2 TWIN2X1024A-5400UL 1GB (2 x 512MB) DDR2 Memory Kit, $300

Swank Storage Solutions

- Hitachi Deskstar 7K500 500GB, 7,200rpm, 16MB cache, SATA Hard Drive, $350
- Western Digital Raptor 74GB, 10,000rpm, 8MB cache, SATA Hard Drive, $185
- Maxtor DiamondMax 10 6L200S0 200GB, 7,200rpm, 16MB cache, SATA Hard Drive, $90

Opulent Optical Drives

- Plextor SATA DVD Burner PX-716SA/SW, $125
- LITE-ON IDE DVD Burner SOHW-1693S, $43

A Powerful PSU

- Thermaltake Silent PurePower 680W ATX Power Supply, $159

An Exclusive Enclosure

- Silverstone Temjin SST-TJ04 Aluminum Mid-Tower Case, $99
- Cooler Master Centurion 5 CAC-T05-UW Mid-Tower Case, $49

Vivid Video Cards

- BFG Tech BFGR78256GTXOC GeForce 7800 GTX, 256MB, PCI Express x16 Video Card, $549
- ATI All-In-Wonder Radeon X800 XL, 256MB, PCI Express x16 Video Card, $399

Deluxe Displays

- Dell UltraSharp 2405FPW 24-inch Wide Aspect Flat Panel LCD Monitor, $1,199
- Viewsonic VX924 19-inch Flat Panel LCD Monitor, $379

Audacious Audio

- Creative Labs Sound Blaster X-Fi Elite Pro, $399
- Creative Labs Sound Blaster X-Fi Fatal1ty FPS, $279
- Creative Labs Sound Blaster X-Fi Platinum, $199
- Creative Labs Sound Blaster X-Fi Xtreme Music, $129

Superb Sound

- Logitech Z-5500 Digital 5.1 speakers, 500 watts, $279
- Zalman ZM-RS6F Surround Sound Headphones, $49

Impressive Input Devices

- Logitech Cordless Desktop MX 3100, RF Wireless Keyboard And Mouse, $99
- Logitech Cordless Desktop LX700, RF Wireless Keyboard And Mouse, $69

VELOCITY micro

THIS COMPUTER IS BUILT BY PEOPLE WHO NEVER FOUND A COMPUTER THEY REALLY LIKED.

MAYBE YOU KNOW THE FEELING.

This is the machine you've been hearing about. Velocity Micro Gamer's Edge DualX. Wicked speed. Awesome power. Expect unbeatable graphics performance. It burns through high-end digital media like a drag racer, which explains our impressive reputation in gaming circles. From the AMD® Athlon™ 64 3800+ Processor to the incredible 256MB eVGA™ NVIDIA® GeForce™ 7800 GT video card, this thing sings. Add the 250GB Western Digital™ 7200rpm hard drive to the 2 x 512MB Mushkin™ DDR400 PC3200 memory and you will see exactly what a computer was meant to do: Make you smile. Each of our machines is handmade to your exact specs by technophiles obsessed with perfection using the best components on the market. We test them again, again and again and back them with tech support that brings new meaning to customer service. You want power, speed and perfection? This is 'the' machine.

Gamer's Edge DualX described above: $1,995

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GIFTS FOR GADGET LOVERS

Have You Been A Naughty Or Nice Little Gearhead?

There has never been a better time to be a gadget lover. Thanks to wireless technologies, cheaper-than-ever storage, wide availability of color LCDs, and other advancements, electronic gear can do more for us than ever. Increasingly, portable devices are becoming multifunction machines, taking the place of several other gadgets. At the same time, home electronics provide better sound, higher resolution, and more features than ever.

Here's our holiday roundup of gear fit for those gearheads on your shopping list. These gadgets are new, fresh, sexy, and superbly cool in function. Whether you're just hunting for gift ideas or buying for a friend, family member, or that special someone, you're sure to find a piece of gear that'll please.

Photo & Video Gear

Creative DiVi CAM 428

This 4-in-1 gadget is just the thing for the geek on the go. The DiVi CAM 428 (www.creative.com) is an affordable multiformat recorder that works as a digital camera, video recorder, voice recorder, and MP3 player. In video mode it captures movies at a respectable 640 x 480 resolution at 30fps. As a digital camera, it grabs 4MP images and can optionally interpolate those to a whopping 8MP.

The built-in LCD rotates so you can shoot pictures or movies from almost any angle. There's only 32MB of built-in memory, which will certainly fill up fast, but you can add a 1GB SD card to store more pictures, movies, and music. Perhaps best of all, the suggested retail price for this versatile machine is just $199.

Canon PowerShot SD550 Digital Elph

Every photo geek wants a digital camera that packs the most megapixels possible, but carrying a large, expensive digital SLR around isn't always feasible. The PowerShot SD550 ($489; www.canon.com) crams 7.1MP into a small, attractive curved case, so you'll be able to take spontaneous images anywhere. The 3X optical zoom (4X digital) is useful for wide and telephoto images with a respectable 37 to 111mm range. The SD550 is meant as a point-and-shoot camera, so photogs who want to take exacting control of images may be disappointed by the manual mode, but the camera can take VGA-quality video (up to 60fps at 320 x 240), and there are numerous smart shooting modes that optimize the aperture and shutter speed for shooting children at play, portraits, nighttime images, and other scenes.

Mattel Vidster

In 1988, Fisher-Price released the PixelVision video camera for kids to record grainy, black-and-white movies on audio

tapes. The toy developed a cult following among filmmakers and technophiles. Today, Mattel's Vidster (www.mattel.com) is the kids' video toy that adults will want to play with. It's an $80 video camera that's meant to keep tiny, grubby hands off the grownups' camera. The specs aren't impressive (it's a toy, remember), but the Vidster's technical limitations add to its charm. The Vidster stores six to eight minutes of 15fps video on a 32MB SD card (which you can upgrade for longer movies). There's no optical zoom, but there's an LCD. You might want to hack it or enter your creation in a local film festival, but if you find one under the tree, contain your glee; it might be for your child, not you.

Communications

Samsung SCH-i730

When it's time to upgrade an aging mobile phone, your favorite geek will want to do it right. The Samsung SCH-i730 ($700; www.samsung.com) is an impressive Windows Mobile smartphone that combines PDA and phone features into a sleek unit. The phone supports five wireless protocols, including Wi-Fi and Bluetooth. You can chat using the speakerphone or a wireless headset, and when you want Internet access, you can use the slide-out thumb keyboard or a Bluetooth keyboard to access the Web from any Wi-Fi hotspot without using cellular minutes. The phone, which works with Verizon's cellular network, also plays MP3s and videos and includes pocket versions of Word, Excel, and Outlook.

RCA Cell Docking System

You are chilling at home when the phone rings. Not your landline phone,

the cell phone. But where is it? The RCA Cell Docking System (communications.rca.com) can help out; it combines your landline and mobile phones into one convenient handset. The docking station connects to your phone line and your cell phone, so you can use the system's handset to answer and place calls on either phone line. The combination makes it easy to use your free cellular minutes for outgoing calls all weekend long, but still have a phone in easy reach when mom calls on the landline. You can even use the docking system to make three-way conference calls using the mobile and landline phones. The $150 unit works with 60 mobile phone models from Nokia, Sony Ericsson, and Motorola.

On The Go

Garmin Quest 2

A good GPS receiver can make the difference between getting to your destination on time and driving around in circles for hours. Wherever you are, Garmin's Quest 2 GPS unit ($699; www.garmin.com) will keep you from getting lost. It comes preloaded with maps for all of North America, so you won't have to load it with new maps when you're getting ready to travel to a new city. The Quest includes a color display and voice-promoted navigation. There's 140MB of extra memory, so you can load in topographic, maritime, or other specialized maps. At just 5.5 ounces, the unit is small enough to carry while geocaching, and it comes with a suction cup mount for the car, where you'll want to leave it most of the time. When it's time to go home, a single button will show you the way from anywhere.

TomTom Go 300/700

The TomTom Go series is another splendid GPS navigation option. The Go 300 ($699; www.tomtom.com) shows where you are and where you're headed using beautiful first-person color graphics. Voice navigation tells you how to get where you're going in your choice of 30 languages and 50 voices. The Go 300 comes loaded with the entire U.S. road system, and you can plan your trip by defining multiple waypoints and destinations along the way. The Go 700 ($899) adds Canadian roads and lets you make hands-free calls using your Bluetooth mobile phone. You can juice the features of either model by subscribing to Plus Services, which include real-time traffic information, information about the location of traffic-monitoring cameras, weather updates, and downloadable city maps.

Palm LifeDrive

The LifeDrive Mobile Manager ($499; www.palm.com) is a tool for those of us who need to stay connected but don't want to tote a full-sized laptop everywhere. This sleek gadget does most of what a laptop can do but fits in one hand. You can fill its 4GB hard drive with Word, Excel, PDF, and PowerPoint documents, video files, and digital pictures, all of which you can view on the unit's large color screen. The LifeDrive can also play MP3s, record voice messages, and, thanks to Wi-Fi and Bluetooth support, access email and the Web from hotspots. When you're on vacation and have filled up your digital camera's memory card, you can copy your photos to the LifeDrive to free up space on the camera.

Mobile Music & Video

Walkman Digital Music Player

More than 25 years after the Walkman cassette player hit the streets, Sony (www.sonystyle.com) has reincarnated the

brand, this time as an MP3 player. This sweet-looking player features an organic electroluminescent display that blends in with the case almost seamlessly. It's available in 6GB (model NW-A1000) and 20GB (model NW-A3000) versions. Besides the sleek look, the neo-Walkman includes cool ways to listen to your tunes, including a Favorite Shuffle mode that selects from your 100 most-listened-to tunes and Time Machine Shuffle that gets in a groove by playing songs from a particular year. An Artist Link function suggests artists and bands that are closely linked to the genre you're currently listening to. Prices had yet to be set at press time, but this Walkman gives a fresh look to the world of MP3 players.

Sling Media Slingbox

We reviewed the Sling Media Slingbox last month (page 23), but we loved it so much (we gave it a perfect rating), we had

to include it here. The Slingbox ($249; www.slingbox.com) lets you watch your TV from anywhere. At home just connect it to your cable box or DVR and your broadband Internet connection. You can then watch shows on a computer anywhere else with an Internet connection—in the den, at a Wi-Fi-enabled coffee shop, at work, etc. If you travel often, this is a great way to time- and place-shift your favorite TV shows. Even if you don't

A Bite Out Of The Apple

Apple Computer (store.apple.com) is a perennial source for drool-worthy hardware, and its recent releases are no exception.

If it's an MP3 player you're after, the diminutive iPod nano weighs 1.5 ounces, has a color screen, and can run 14 hours between charges. Besides playing MP3s and music from iTunes, the nano can display digital pictures as part of an audio slideshow. It also adds to the iPod line a world clock, stopwatch, and combination lock function to keep Hoobastank-haters from messing with the controls. The nano is available in a 2GB version ($199; about 500 songs) and a 4GB version ($249; about 1,000 songs).

If you're still suffering with the hockey puck-shaped mouse that came with your Mac, it's time to move on. Apple's Mighty Mouse ($49) is a great-looking and innovative mouse. Instead of a scroll wheel, it features a scroll ball (think tiny track ball) that lets you move around documents in any direction. The two invisible top buttons and two side buttons are touch-sensitive, providing a welcome departure from the one-button mice that have been the Mac standard since 1984.

For big spenders there's really no question which Apple product to covet: the 30-inch Cinema HD display. This widescreen monitor has a monster 2,560 x 1,600 resolution, as well as a monster $2,999 price. If that breaks your budget, we're confident the Mac-loving geek in your life wouldn't balk at the $799 20-inch or the $1,499 23-inch versions. The monitor (any size) includes two FireWire and two USB 2.0 ports for easy access to connect your digital camera, iPod, and other peripherals.

Dropping from the Apple tree soon, though certainly not before year's end, will be new Macs running on Intel processors. Apple is expected to release Intel-powered versions of its high-end computers sometime next year, followed by lower-end Macs, such as the Mac mini and iMac. Although you won't find an Intel-inside Mac stuffed in your stocking this year, the end of December and January is always a great time to grab deals on good, old PowerPC Macintosh systems. Keep your eyes peeled for post-holiday buys, especially on consumer-oriented models such as the Mac mini and iBook line. ▲

travel, the Slingbox can turn your laptop at home into a portable DVR.

Home Entertainment

Samsung Twin-Tray DVD Recorder

Your old DVD-VCR combo player might as well be a Stone Age relic. The Samsung DVD-TR520 twin-tray DVD recorder (www.samsung.com) will bring new love to the living room. At $450, it may be the first affordable dual-tray consumer DVD burner. It can copy—excuse us, back up—a two-hour DVD in as little as 20 minutes with the touch of a single button. It supports DVD-RAM, -R, and -RW formats (but not +R/+RW varieties, nor dual-layer DVDs). The recorder's auto-fit function lets it detect the remaining space on the destination disc and choose the optimal recording mode to make it fit while preserving video quality. You can record TV shows directly to disc or use the DV input to transfer footage to DVD from your MiniDV camcorder.

JVC DR-DX5S

Another option for the living room is the JVC DR-DX5S, which combines a 250GB hard drive digital video recorder, DVD burner, and MiniDV recorder into one machine. The magic is that it lets you move data between any of the three media. For example, you can record a TV show to the hard drive and burn it to DVD. Or you could copy a home movie from your MiniDV camcorder to the hard drive for editing and then save the edited version to DVD. The DR-DX5S ($1,500; www.jvc.com) records and plays back DVD-RAM and DVD-R/-RW formats and can play DVD-Video and compact disc formats. With a full complement of connectors, including FireWire input and component output, this machine could be the centerpiece of your home theater system.

Sony MDR-DS4000

From PlayStation 2 to the iPod, fun technology tends to be loud. Sony's MDR-DS4000 wireless headphones ($190; www.sonystyle.com) let you rock out without annoying your parents, spouse, neighbors, or anyone else around. The digital infrared system provides hiss-free sound up to 33 feet from the wireless base station (although not into the next room; the headphones need line-of-sight transmission). The unit weighs only 11 ounces, which is light enough for extended gaming or listening sessions. They support 5.1-channel surround sound and are compatible with Dolby Digital, Dolby Pro Logic II, and DTS encoding technologies. When you don them, they automatically turn on, and when you're done, just put the headphones on the base station, and they'll automatically recharge for next time.

Just Plain Useful Stuff

Podzilla Gadget Bag

If you or your favorite gadget lover are already straining under the load of a half dozen or more portable electronic gizmos, perhaps more gadgets isn't the answer. Instead, a way to organize them all is in order. The Podzilla Gadget Bag from Roadwired ($69.95; www.roadwired.com) holds a camera, MP3 player, portable game, and GPS, plus every cable, cord, charger, battery, adapter, and other accessory they might need along the way. The versatile nylon bag includes more than 20 compartments and pockets, and you can wear it as a waist pack on your belt or use its shoulder strap. The bag is fully padded, and elastic organizers and built-in bungees keep accessories in place and out of harm's way. There's even a secret pocket to stash your cash or keys.

Retro LED Digital Watch

We love shopping at ThinkGeek.com, a site that's rife with stuff geeks would love, such as a USB microscope and a Swiss Army knife with a built-in USB drive. But our favorite new gadget at ThinkGeek.com is an old gadget: an LED wristwatch ($85) that's similar to the watches proto-geeks were wearing in the 1970s. When Seiko introduced liquid-crystal display watches in 1979, the glow of LED timepieces quickly became obsolete. This watch lets you revel in the joys of good old tech; it glows with red seven-element LEDs set against a chrome or gunmetal finish. (If you prefer something more obfuscated, ThinkGeek.com also sells a watch that displays the time in binary.) ▲

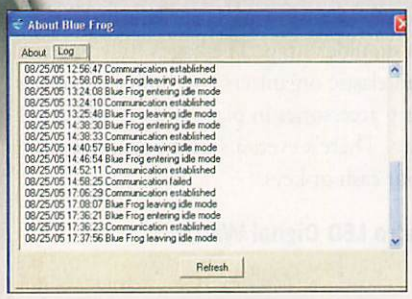
by Kevin Savetz

by Warren Ernst

The Bleeding Edge Of Software

Inside The World Of Betas

Blue Frog 1.0.1.1056


About Blue Frog
About
Log
08/25/05 12:56:47 Communication established
08/25/05 12:58:05 Blue Frog leaving idle mode
08/25/05 13:24:08 Blue Frog entering idle mode
08/25/05 13:24:10 Communication established
08/25/05 13:25:48 Blue Frog leaving idle mode
08/25/05 14:38:30 Blue Frog entering idle mode
08/25/05 14:38:33 Communication established
08/25/05 14:40:57 Blue Frog leaving idle mode
08/25/05 14:46:54 Blue Frog entering idle mode
08/25/05 14:52:11 Communication established
08/25/05 14:58:25 Communication failed
08/25/05 17:06:29 Communication established
08/25/05 17:08:07 Blue Frog leaving idle mode
08/25/05 17:36:21 Blue Frog entering idle mode
08/25/05 17:36:23 Communication established
08/25/05 17:37:56 Blue Frog leaving idle mode
Refresh

Official product name: Blue Frog
Version # previewed: 1.0.1.1056
Publisher: Blue Security
Developer and URL: Blue Security; www.bluesecurity.com
ETA: Q4 2005
Why you should care: Send spammers a real message.

Nearly all the programs designed to end spam really just filter it, typically just hiding it from your view. This can reduce your Inbox clutter and might seem almost as good as ending spam, but it doesn't really stop spam writers from generating it. If you want to truly punish spam writers and lower your spam (and if you don't care if two wrongs don't make a right), consider Blue Frog.

The app combines a free (for now) service you sign up for and a small applet that runs in the background occasionally connecting to the Internet. When you sign up, your email address is added to a Do Not Intrude list (similar to the Do Not Call Registry), which spammers are encouraged to download and use to prune your address from their email lists.

What keeps spammers from just sending spam to these verified good email addresses? When Blue Frog members receive spam, they can report it to Blue Security. When Blue Security gets enough complaints, it creates a script that bombards the spam sender, the spammer's ISP, and the Web site of the product listed in the spam with email and Web page requests to stop sending spam to Do Not Intrude Registry members. The script is fed to all the copies of the Blue Frog applet on members' computers, flooding the spammers and their sites.

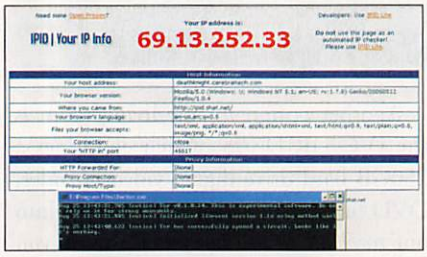
Sound like a DDoS attack to you? It is by some (though not all) definitions, but perhaps you feel spammers are just getting what they deserve. There's no denying that Blue Frog is effective. My spam count went down about 20% in one week, and more than a dozen spammers have shut down domains already as a result of all this. The software's source code is available for review, and it appears safe. ▲

Tor 0.1.0.14

Many users think their online activity is anonymous. It's not, of course. Your ISP (or employer if you're online at the office) can easily detect what you're looking at, and those running the Web servers you're accessing can see where you're coming from. Anonymous proxy servers and anonymizer networks are a good start, but getting them up and running can be troublesome. Tor, however, is fairly simple to use and is backed by the Electronic Frontier Foundation.

Tor is free, open-source software available for Windows, Mac OS X, and Linux/Unix. In Windows it works with Privoxy (www.privoxy.org) to make it appear you have a proxy server running on localhost on your own PC. When you set the proxy settings in your Web browser and other software to this local proxy, you're hooked into a server network (onion routers) that bounces your traffic among a random number of Tor server nodes on the Internet. Because there's built-in encryption, no real logging among the nodes, and the node path changes every few minutes, there's no real way to track identity. Your ISP sees nothing but traveling packets. Web sites only see traffic from Tor nodes, and the nodes handling your traffic change every few minutes. Combined with a Firefox extension such as SwitchProxy, switching gears from a relatively secure (but slow) Tor connection to a quick but visible normal Internet connection is a breeze.

An app with such good privacy can certainly open up some possibilities, including everything from the illegal activities to genuine security testing to checking a competitor's site without revealing you were there. The software is easy to use, stable, and free, so there's no reason not to try it. ▲



Official product name: Tor
Version # previewed: 0.1.0.14
Publisher: The Tor Group
Developer and URL: The Tor Group; tor.eff.org
ETA: Unknown
Why you should care: Painless and free anonymous Internet use is handy sometimes.

UP TO SPEED

Upgrades That'll Keep You Humming Along

Widget lovers rejoice. Konfabulator, the app that places all sorts of playful and functional thingamabobs on Mac and Windows desktops is now freeware, courtesy of Yahoo! Adobe Acrobat gets a security fix, and numerous familiar programs add support either for 64-bit processors or Windows XP Pro x64 Edition. Kerio and KlipFolio gain new functionality, and those with Nvidia SLI display arrays can crank up antialiasing gameplay another notch.

Upgrades

Adobe Acrobat Professional 7.0.3

The update fixes a buffer overrun issue for better security. An Adobe Reader version with the same numbering is also available, plus fixes for Mac and Windows versions of Pro and Reader.

Get it at: www.adobe.com

DVDPean Pro 3.6.2

DVDPean extracts audio tracks from DVDs by time segment, frame, or chapter and transfers them into any popular format, even OGG and FLAC. Recent updates added multinational support, resolved output issues, and optimized the kernel for greater speed.

Get it at: www.dvdpean.com

Everest Home Edition 2.20

This benchmark and diagnostics tool gets an improved hardware monitor, real-time alerts for plug-in devices, better information from portables, updated graphics chip support, and a new sharpness test for monitors.

Get it at: www.lavalys.hu/index.php?lang=en

Google Extensions for Firefox

In addition to finally releasing its official toolbar for Firefox, Google offers extensions for the alternative browser that let you send a text message to a mobile phone or auto-complete terms you type in the Firefox search box.

Get it at: toolbar.google.com/firefox/extensions

HyperSnap-DX 5.63.00

The venerable screen capture software can now apply black-and-white conversions automatically to all grabs. The scrolling function is compatible with Netscape 8, and cursor capture functions have been fixed.

Get it at: www.hyperionics.com

Kerio Personal Firewall 4.2.0

A new Host Intrusion Protection System purports to guard against intrusion by blocking irregular behavior from applications. The configuration windows are simplified, and a new window records intrusions that the firewall blocks using its various methods. This release drops support for Windows 98/Me/NT4.

Get it at: www.kerio.com

KlipFolio 3.0 Beta B

This longstanding pop-up headline feed now has better RSS support, a better interface, deeper selection of "Klips" (feeds), and bug and performance fixes.

Get it at: www.serence.com

Konfabulator 2.1.1

The engine that puts any of 800 user-made tools on your Desktop has multiple fixes involving opening URLs, animated effects, and interaction with Windows OSes. Specific widgets (weather, stock ticker, picture frame, etc.) get new features and content. Oh yeah, Konfabulator is now free.

Get it at: www.konfabulator.com

SoundForge 8.0b Build 110

The full-featured audio-editing suite gets an update to the recent 8 version, which includes application scripting, batch conversion, ASIO driver support, HD video options, and Flash importing.

Get it at: www.sonymediasoftware.com

SYSMark 2004 SE

This suite of real-world application benchmarks gets upgraded to support WinXP Pro x64 Edition. The suite also incorporates all previous SYSMark 2004 updates and patches.

Get it at: www.bapco.com

VMWare Workstation for Windows 5.5 (Beta)

This tool allows multiple OSes to run on the same partition and share data and network functions. The new release supports 64-bit OSes and converts third-party virtual machines to VMWare format.

Get it at: www.vmware.com

Driver Bay

ATI Catalyst 5.8

The new Radeon drivers add COPP (Certified Output Protection Protocol) support for viewing hi-def video on some external devices. This upgrade also resolves issues with Battlefield 2, GTA: Vice City, and Area-51.

Get it at: www.ati.com

ATI Proprietary Linux Drivers 8.16.20

These drivers support most FireGL, Radeon, and Radeon Mobility chipsets running under Linux. This version offers better workstation performance and display detection and supports Linux Kernel 2.6.12 and GCC 4.0.

Get it at: www.ati.com

Creative Sound Blaster Audigy Audio Console 1.20.23

The interface for adjusting audio properties in most Audigy series cards gets unspecified tweaking.

Get it at: www.creative.com

Nvidia ForceWare 78.01

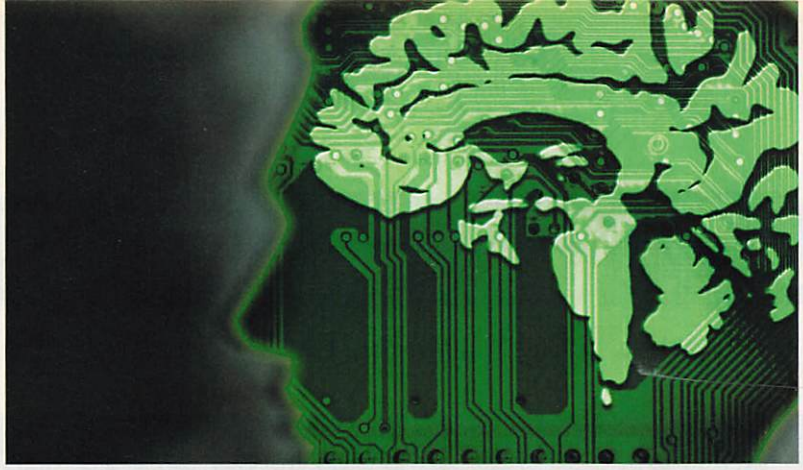
For most Nvidia boards, recent updates add support for the GeForce 7800GT, SLI support for the 6600/LE models, and better SLI optimization for new games. Antialiasing also gets pumped by a new SLI Antialiasing mode.

Get it at: www.nvidia.com

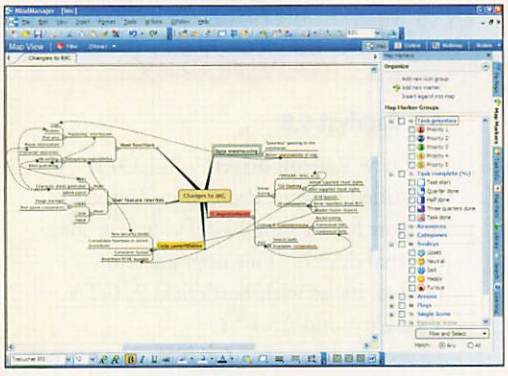
by Steve Smith

Mind Tools

Software For Your Brain



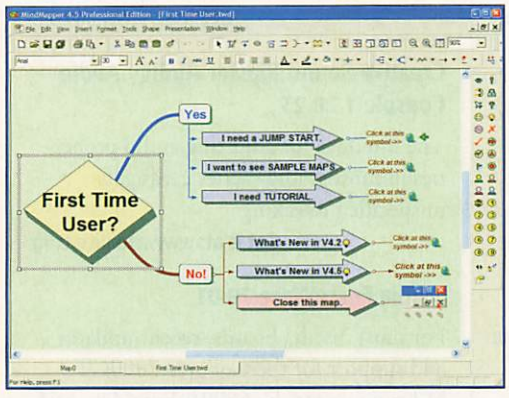
Popularized in computing and IT, the phrase "like nailing jelly to a tree" can also be used to describe dealing with ideas that are nebulous and hard to get a grasp on. If the ideas you're trying to sort out are crucial to getting a project done, you'll need all the help you can get. A line of software products called mind tools, or idea-mapping software, may be just what you need.



MindManager X5 Pro
$296.65 (single-user edition; volume discounts available)
Mindjet
www.mindjet.com

Mind-tool programs are like a cross between a flowcharting application and an outline generator. You throw in a bevy of unorganized ideas, which you can then shape graphically by grouping and linking associated notions in a chart. This makes it easier to wrap your mind around complicated groups of ideas with many subdivisions instead of plowing through an itemized list.

I examined three mental-organization tools: MindManager X5 Pro, a professional-level product; MindMapper 4.5, a more entry-level application; and FreeMind, a freeware/open-source program. (MindManager and MindMapper have 30-day trial versions available.)



MindMapper 4.5 Pro
$179.95
SimTech Systems
www.mindmapper.com

MindManager X5 Pro

MindManager's interface lets you concentrate on organizing your ideas instead of fussing with program settings.

MindManager is both the most powerful and most expensive of the programs I examined. That said, anyone who needs a truly professional-level idea-mapping tool will find their money well-spent.

MindManager's edge is twofold. One, it has an outstanding user interface, so you spend less time wrestling with the program and more time actually collating ideas. Two, it integrates broadly with third-party applications—not just Microsoft Office, but other apps often used by those who use mind tools in the first place such as SalesForce.com.

You will probably want to start with the program's Brainstorm mode. Here, you just type in as many ideas relevant to your topic as possible, in no particular order, and then organize them into tentative categories and hierarchies. As you get a better grip on the topic and move things around, an idea keyword might become a category or vice versa. The more you work with it, the more the ideas organize themselves and shake themselves out. (The one hard part of the program is the object styling tools; see the review of MindMapper for a comparison of details.)

There are other ways to view the map, too. Outline mode most directly resembles the outline function in Word and PowerPoint. Presentation turns the whole map into a PowerPoint-like presentation, unfolding each node of the map like a flower blooming to illustrate each idea. It's better than going a slide at a time because you can always see the whole thing at a glance.

You can link and manipulate multiple maps together and in groups (a multimap), and you can also make links to external files or URLs. One handy feature is a Repair Broken File Hyperlinks tool, which iterates through all external links in the document and ensures they're still valid.

MindManager's integration with Office works a number of different ways. Aside from being able to export maps to apps such as Word or PowerPoint, you can import a Word outline into MindManager as a map, synchronize a map's to-do and completion data with a Project timeline and even synchronize

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

contact data stored in a map with Outlook. Another package lets you integrate with the SalesForce.com's line of CRM products, a powerful feature only this program supports.

You can export a finished map in a wide variety of formats: Web pages (in either a static or dynamic, CSS/DHTML-driven style), bit-mapped images, Metafile vector images, XML, and many more. The Pack And Go feature compiles the map file and any externally linked files into one self-extracting ZIP archive (no ZIP utility needed).

MindMapper 4.5 Pro

MindMapper isn't quite as polished and upmarket a program as MindManager, but it's a lot more affordable ($179 to MindManager's $299) and most of its functions are comparable to MindManager.

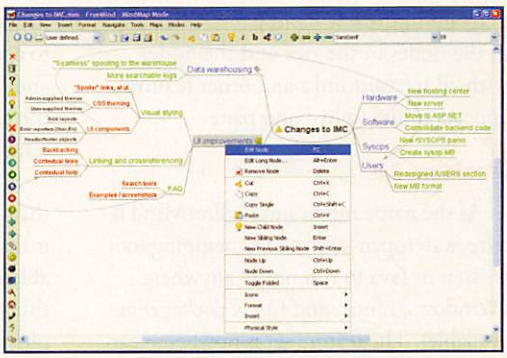
Start the program and you'll see a map with links to the program's how-to tutorials. These tutorials are among the program's best features. If you know nothing about how idea-management software works, you can fire up a Flash-based tutorial that walks you through how to create a map and populate it, how to work in outline mode, and how to do advanced grouping and linking among objects.

MindMapper actually has a few features MindManager does not. For one, you can view the outline and map view for a given map simultaneously in side-by-side panels. Click a node in the outline view and it assumes focus in the map, with all lower-level nodes in the tree temporarily removed from view. This is a nice way to drill into a map and look only at what you need.

It's also easy to modify the general look of the map. With one click you can choose whether subjects radiate outward from the central node, appear in a tree next to it, or are arranged in some other fashion. MindManager has similar object-styling tools, but they're a little less straightforward to use at first glance; you have to create general styles and then apply them (or use a pregenerated style), and the style-creation tool is a little arcane.

MindMapper's presentation mode has some nice commonsense touches: For one, you can open a pane that shows a preview of what the automatically generated slide view of the presentation will look like. There's less integration with other programs, but the integration features are unique; for instance, the Auto Paste Mode (used with Word) lets you select blocks of text and convert them automatically into new nodes in the map. You can also import and turn PowerPoint documents into diagrams.

The program's export functions let you save a map to most common graphics files, XML, and of course HTML. Exporting a map to HTML produces a simple two-panel document with a tree



FreeMind 0.8
Free/open source
freemind.sourceforge.net

The History Of The Mind Map

Mind maps are one of the many ways you can represent ideas, and representing ideas symbolically goes hand-in-hand with the history of the human race. Porphyry, a Greek thinker of the 3rd century B.C., devised one of the earliest versions of the mind map to illustrate the concept categories formulated by fellow philosopher Aristotle. That said, mind maps themselves are a relatively new invention (circa 1960 or so), spawned from the convergence of several ways of representing ideas.

The Venn diagram. In the 19th century, British mathematician John Venn created the Venn diagram as a way to graphically represent relationships among sets of things. Mind maps aren't Venn diagrams per se, but they use one of the key conceits of Venn diagrams: that you can group related ideas together spatially. MindManager and MindMapper both make explicit use of this concept by letting you create clouds of related ideas on your map.

The concept map. An early version of the mind map, called a concept map, was originally developed by learning experts in the 1960s as a way to facilitate learning. One of the widely touted advantages of the mind map, which comes directly from concept maps, is that it uses both sides of the brain at once (the perceptive and analytic halves) and therefore engages the brain more completely. (This hasn't yet been borne out by study, possibly because mind-mapping is still a relatively new technique, but it's an intriguing notion.)

The flowchart. Originally pioneered by 20th century efficiency experts and computer scientists, flowcharts became a popular way to show how you could do a particular thing. Mind maps use the basic idea of the flowchart layout (using lines to illustrate connections among discrete elements) and pushed it into a different direction. Because ideas don't have a start or a finish, the mind map can, in theory, begin anywhere and end anywhere. ▲

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

diagram in the left-hand pane. Click any of the nodes in the tree and the node, with all relevant links and other features, appears in the right-hand pane.

FreeMind 0.8

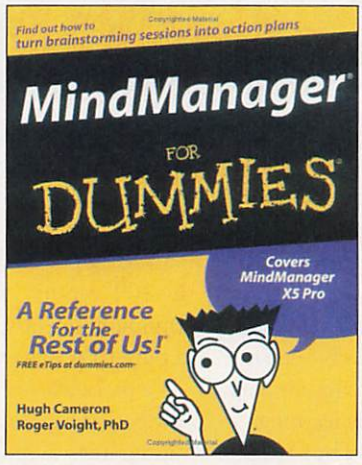
As the name might imply, FreeMind is a freeware/open-source idea-mapping tool written in Java to run nearly anywhere (Windows, Linux, and OS X packages are available). The feature set is nowhere nearly as robust as the other programs discussed here; there isn't any integration with external programs, and the UI isn't that sophisticated. However, it's free, and for people looking to get their hands on an idea-mapping tool just to learn the road, it's not a bad place to start. It's also continuously evolving, so many of the criticisms I have here are slowly being addressed.

The user interface is simple enough: Like the other programs described here, it surrounds the map with a number of toolbars with various functions. You can mark map nodes with icons or surround selected nodes with a cloud to indicate a common association. If you don't like where a node is positioned, you can drag it around, and also control the direction of branching for a particular child node. Right-clicking a node and then dragging to another node creates an arrow link, and you can also manipulate the path of the arrow to keep it from being overwritten by other elements.

FreeMind does have a few features that the other programs lack. The most notable is the ability to create password-encryptable nodes. Most of the good features are things found in other programs, but implemented well, for instance, automatic formatting of the map or being able to track revisions to nodes. You can import maps created in MindManager X5 into FreeMind with most of the map features kept intact. You also can export maps (or parts of maps) to dynamic or static HTML, an OpenOffice document, or a static image.

There are still some things missing, though. There isn't a real presentation mode, and the program lacks productivity functions such as task assignments or calendaring. Still, it's hard to argue with the price tag, and the program's amazingly rapid development is worth watching. When version 1.0 hits, it should be a keeper. ▲

by Serdar Yegulalp



MindManager For Dummies

If you're still confused about mind mapping, consider "MindManager for Dummies." Aside from covering the feature set of MindManager in its Standard, Business, and Enterprise releases, there are detailed real-world examples of how to communicate ideas with the program.

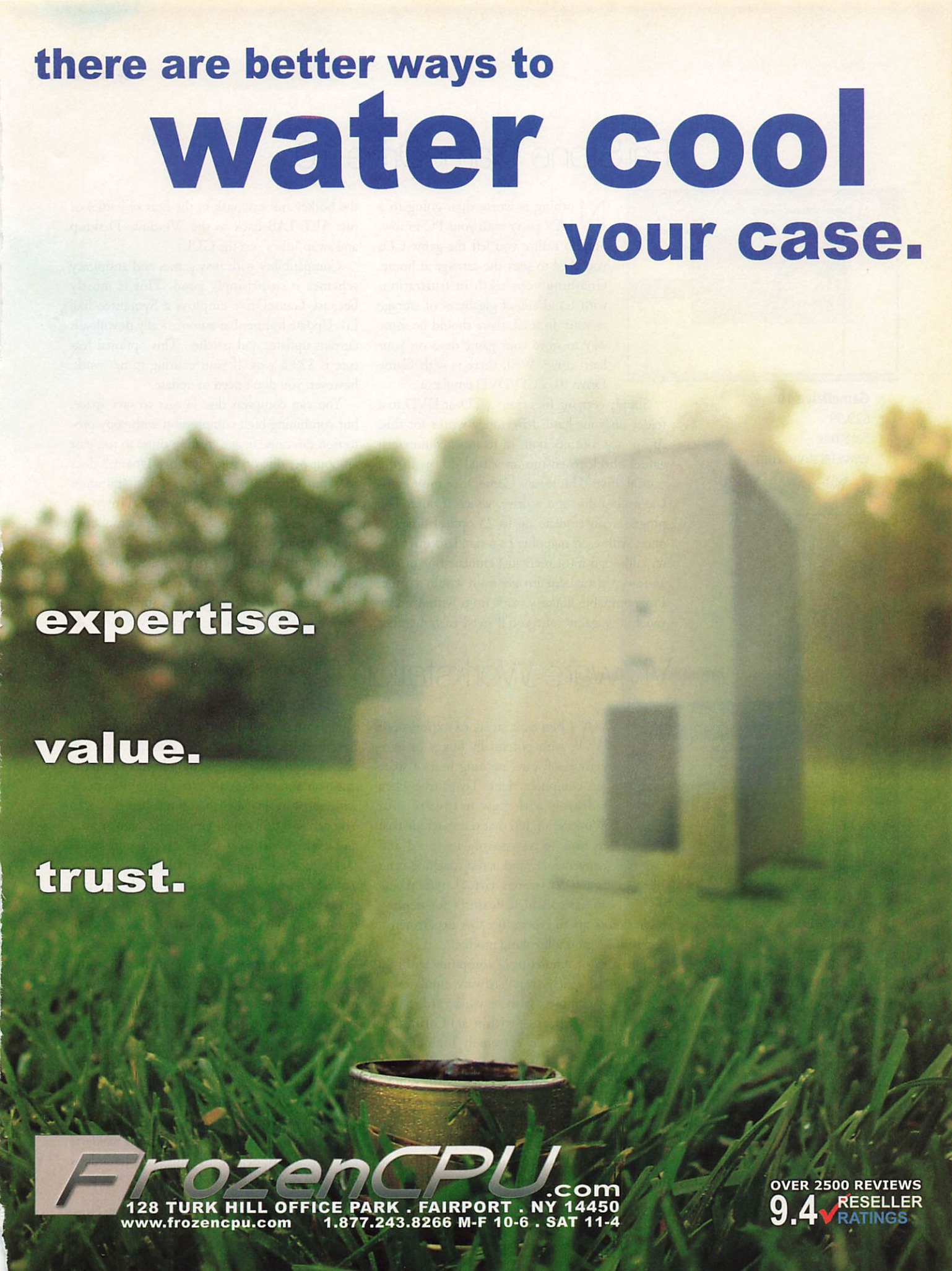
Make Mind Maps Work For You

Mind-mapping programs are only going to be as good as the people using them. Because many people aren't used to the way mind mapping works, here are some hints to help you open up your synapses and make the most of any mind mapper.

1. Get your sea legs first. Mind mappers aren't quite like word processors, presentation programs, or databases. They retain a few features from each of those applications, but they're ultimately not like anything else out there. For that reason, the more direct experience you have with an idea-mapping program in any context, the better. If you're going to use a mind-mapping program to organize some major work effort at some point, try using it first to sort out ideas for a personal project. That way you can see how the program's workflow applies to your own way of thinking and then put that to use for more serious work later.

2. Train yourself to brainstorm. When we write down sets of ideas, most of us tend to force ourselves to precategorize everything. With a mind mapper, you can come up with the ideas in any order, without even having to decide categories for them first. The more you do this for *any* subject, the better you get at it. Don't worry about throwing out too many ideas or whether they're absurd; you can always pare them down later.

3. Use questions as well as statements to feed your map. Most people start creating a map by tossing out static, closed-ended statements, such as, "This needs to be done." Try using questions as well as statements to create parts of the map. A question such as, "Do we really need to do this particular part of the project?" could spawn a whole subsection of the map in which many unquestioned assumptions about what you're working on get put to the test. This, in turn, means more raw materials to put into the map. ▲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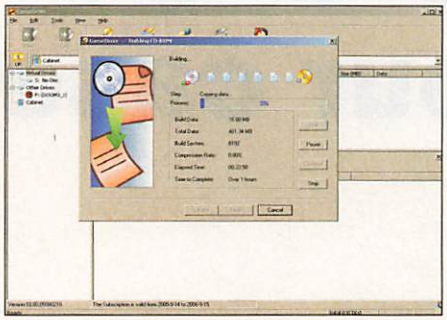
9.4 RESELLER RATINGS

by Warren Ernst

FarStone GameDrive 10



GameDrive 10
$29.99
FarStone
www.farstone.com

Nothing is worse than going to a LAN party with your PC in tow, only to realize you left the game CDs you need to start the carnage at home. Gnashing your teeth in frustration, with hundreds of gigabytes of storage at your disposal, there should be some way to store your game discs on your hard drive. Well, there is with Game Drive 10, a CD/DVD emulator.

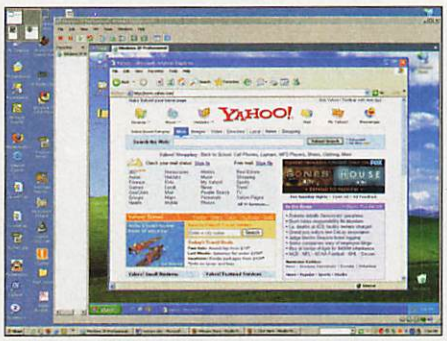
Simply copying files from a CD or DVD to a folder on your hard drive rarely works for this. Antipiracy routines built in to most commercial games check to ensure an actual disc is in the optical drive. This means GameDrive must emulate both a disc and a drive, which it does. The program can emulate up to 23 optical drives at once, with each mapping to a standard drive letter, although most users just emulate one or two and swap virtual disc images from within a game. Programmable hotkeys work from within pretty much any game, but you'll need to remember the hotkey (no easy task in the heat of battle) or just ALT-TAB back to the Windows Desktop and swap "discs" via the GUI.

Compatibility with new games and antipiracy schemes is surprisingly good. This is mostly because GameDrive employs a Symantec-like LiveUpdate feature that automatically downloads current updates and patches. This optional feature is $29 a year. If your existing games work, however, you don't need to update.

You can compress disc images to save space, but combining high-compression with copy protection can cause image creation times to run past an hour per disc on some systems. Doom 3 discs took me 32 minutes each on a 3GHz Pentium 4 system with an 8X DVD burner. However, Doom 3 started 10 times faster with GameDrive, and switching scenes was lightning fast.

Although freeware alternatives exist, they lack GameDrive's broad compatibility and convenience features. And $29.99 is a small price for leaving those CDs at home where they belong. ▲

VMware Workstation 5 For Windows



Workstation 5
$189
VMware
www.vmware.com

When you need to experiment with potentially buggy or dangerous software, nothing beats a spare test computer, right? That's true when working with new hardware, but Workstation has that test machine beat in most ways relating to speed and convenience, and a test machine can't touch VMware's virtual networking abilities. Add in features for deployment across an enterprise (or QA department), and this is a groundbreaking product.

The idea of emulating a computer within a computer isn't new. But VMware emulates an entire PC—complete with network card, sound card, and USB ports—within a PC running Windows or Linux at extremely high speeds. This is mostly because VMware doesn't need to emulate an Intel-compatible CPU with a non-Intel-compatible CPU. The virtual machine runs almost as fast as the native machine (70 to 85% as fast as the host, depending on the benchmark) and can run almost any OS made for typical PCs.

Version 5 adds features that longtime users have been clamoring for. For example, you can take multiple snapshots of a simulated system, letting you almost instantly jump between systems with software installed or uninstalled on each. You can also run several virtual machines at once and create a virtual network on the same host, making testing client/server applications a breeze. You can clone images either directly or via a space-saving link to multiple VMware users, and the app lets you record all on-screen actions to an AVI file to easily document procedures or errors.

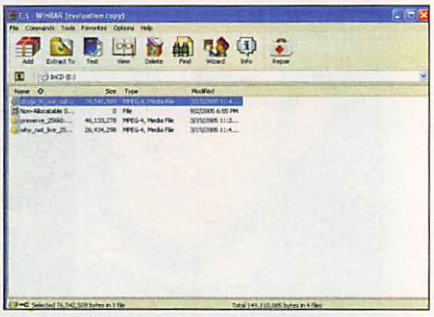
The program performed extremely well in my testing. Viruses I allowed to run wild in a virtual machine were isolated, never reaching the host. On-screen responses were very fast, even when running multiple virtual machines at once, and switching between snapshots is so quick you won't have time to stash your Ghost boot floppies.

VMWare isn't cheap at $189, but that's far less than a new test machine and far more flexible, making it a dream for anyone who regularly tests software or deals with potentially hazardous programs or Web sites. ▲

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

by Wallace Wang

Rarlab WinRAR 3.50



WinRAR 3.50
$29
Rarlab
www.rarlab.com

WinRAR specializes in packing multiple files into one compressed file via an easy-to-use interface. There's also a Wizard available to guide novices through compressing/extracting files. WinRAR also integrates itself into Windows; just right-click a file to access WinRAR commands. WinRAR now also supports interface themes to jazz up the utility's appearance.

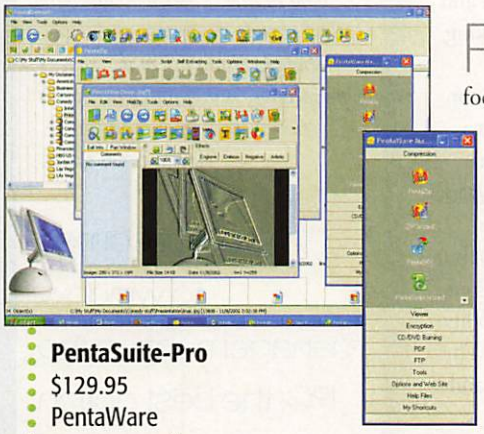
WinRAR isn't a crucial app to own, considering Windows' built-in Zip features, but if you work with many file formats regularly, it's a very good dedicated file-compression app to have. Because RAR files aren't as familiar to many users, WinRAR can also create and open Zip files, plus CAB, ARJ, LZH, TAR, GZ, ACE, UUE, BZ2, JAR, ISO, 7Z, and Z archives. It can also convert compressed files from one format to another. In my testing WinRAR consistently (but not dramatically) compressed files tighter than the popular PentaZip app:

- A Word document and seven JPEGs, 988KB total—WinRAR, 729KB; PentaZip, 744KB
- Paint Shop Pro 7 (577 files in 21 folders), 142MB—WinRAR, 103MB; PentaZip, 116MB
- Three MPEG-4 videos, 142MB—WinRAR, 130MB; PentaZip, 132MB

WinRAR can create self-extracting files, and it uses 128-bit AES encryption. To prevent spreading viruses, the app can work with your antivirus program to scan files before you compress/extract them. It can also automatically detect and work with more popular programs, such as Norton or McAfee, but if you're using a less common AV program, you may need to manually configure WinRAR. This isn't difficult (it does involve typing parameters), but it's definitely not something novices would care to tackle.

Unlike older file-compression apps that can only compress a limited number of files, WinRAR claims to support files and archives up to about 8,589 billion gigabytes in size, effectively making it possible to create compressed files of unlimited size. The app is available in 40 languages, and a 40-day free trial is available. ▲

PentaWare PentaSuite-Pro 8.0



PentaSuite-Pro
$129.95
PentaWare
www.pentazip.com

PentaSuite-Pro 8.0 is a suite of file-management tools that puts a heavy focus on digital photography functions. (There's a frame grabber, photo album creator, and more.) The suite's relatively steep price and avalanche of features reflects this emphasis. To access the features, a PentaWare Manager displays all the suite's apps in a window. You can also right-click files to access PentaSuite's options.

You can use the suite's 17 apps individually, but the greatest benefit seems to come from combining them. For example, PentaBrowser lets you search for a file and view a thumbnail of its contents, whether it's a graphic, Word doc, or PowerPoint presentation. Double-clicking a graphic loads it in PentaView, which has basic graphics editing tools. PentaView isn't a Photoshop replacement, but it does provide quick, simple fixes and enhancements. If you double-click a nongraphics file, such as a Word document, PentaView displays the contents and lets you change some characteristics (bold, italics, etc.), but you can't edit it.

From within PentaView you can print, encrypt, compress, convert to a PDF file, send (via email or FTP), and burn a file to CD/DVD using other PentaSuite apps. Digital photographers should find the batch-file renaming feature especially useful.

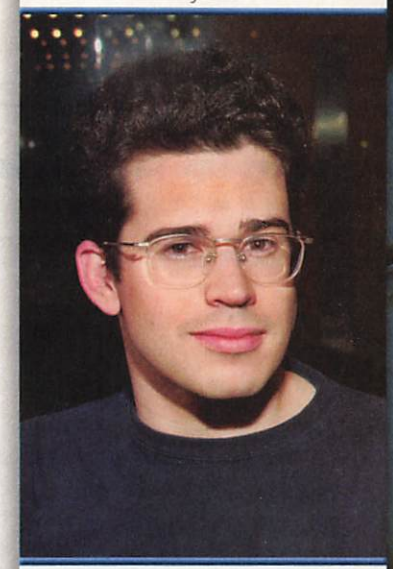
PentaSuite's real power comes from its tools for managing, organizing, and sending files of all types. Anything you can do manually, you can do automatically via the scheduling feature. For example, you can compress backup files and send them via FTP to an off-site location at midnight every day or load images from your digicam and automatically rename them while burning a PDF file of your images to a CD/DVD simultaneously.

If you already have apps similar to those in PentaSuite, the suite probably isn't for you. If not, it's a good tool for managing multiple files and staying organized. There are also DigiPhoto ($69.95) and Business Pro ($84.95) versions. ▲

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

The Switching Task Switchers Task

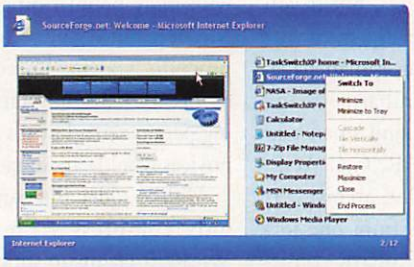
by Chris Pirillo



Chris is the founder and publisher of Lockergnome.com, a technology Web site and content publishing company with more than 1 million subscribers. He also holds the annual tech convention Gnomedex.com, and he recently launched the TheChrisPirilloShow.com audio broadcast for enthusiasts. Produced independently from those who rule your radio dial, the show includes live and prerecorded caller questions, interviews with people who matter, killer new software finds, productivity tips and tricks, thoughts from a female novice's perspective, mini-conferences with two-minute guests, and more. Take a listen today.

It seems like everybody wants to take a bite of the Apple these days. Despite promises that Windows Vista will be worth the wait, many Windows users have grown jealous of their Mac counterparts who have been enjoying the latest in OS technology for several months now. This has forced a lot of people to either buy a Mac or try to emulate some of the fancy-schmancy features on their Windows XP box.

One of the most beloved and useful features of OS X is Exposé. When dealing with many open windows, it can be hard to manage what's going on, and this is a problem that's familiar to Mac and Windows users alike. With Exposé all you have to do is press one hotkey and all your open windows scale down and tile across your desktop in thumbnail fashion. You can easily see what's in each window, and when you find what you need, just click it. The feature is brilliantly fast and beautiful, but do Windows alternatives do it justice? As you'll see, the answer is yes and no. While these apps basically contain the same type of features, the differences in performance and usability are all over the map. I tested each program with six windows open, and the results were surprising.



The free TaskSwitchXP Pro 2.0.

InsaniSoft's iEx (free; www.oxygen-inc.com/premium/InsaniSoft/iEx.htm) is an attractive option due to its price, but you truly do get what you pay for. A window management tool should be unobtrusive, but iEx requires more attention than it deserves. On the surface everything seems in order, but once you run the program, the story changes drastically. We have all used software where you are required to hold your breath and hope for the best, and I found myself having to frequently do that with iEx. Sometimes it will work, and other times your Desktop will throw its hands up in the air and take a lunch break. In some cases the window thumbnails will not properly redraw, and you will be left with a gray box that couldn't look more unattractive.

WinPLOSION ($9.95; www.winplosion.com) did a better job than iEx, but it's not without its problems. One of the main complaints I have about this software is that it doesn't indicate what the window titles are when you roll your mouse over them. Sure, you will see static thumbnail images, but they can be hard to read, and if you are going to pay for software, you might as well get the best bang for your buck.

Those of you who would like to use an application that looks and acts like Exposé will probably want to give Otaku Software's TopDesk ($9.95; www.otakusoftware.com/topdesk) a try. For what it is, it works fairly well. I like the ability to simply click the icon in the System Tray in order to turn the program on and off. Let's face it, you're probably not going to need this software all the time, and being able to disable it quickly without completely closing it out is a plus. TopDesk does experience a few performance bottlenecks, and this is because of its high emphasis on looking better than the competition.

When it comes to window management on the PC, the best option out there right now is the ALT-TAB replacement known as TaskSwitchXP Pro 2.0 (free; www.ntwind.com/taskswitchxp). It may not perform exactly like Exposé (due to its single window interface), but it works better than all the other options listed here. One of the standout features is the ability to minimize windows to the System Tray. The price is right, the performance is fantastic, and the customization options are aplenty.

When it is all said and done, the Taskbar will work just fine for most of us. TaskSwitchXP Pro 2.0 is a great solution for anyone who seriously needs to manage a lot of windows on her Desktop, but if you only care about finding a flawless Exposé clone, then you are probably not going to find it on Windows. Have you considered taking a trip to the Apple Store? ▲

When it comes to window management on the PC, the best option out there right now is the ALT-TAB replacement known as TaskSwitchXP Pro 2.0. . . .

You can dialogue with Chris at chris@cpumag.com.

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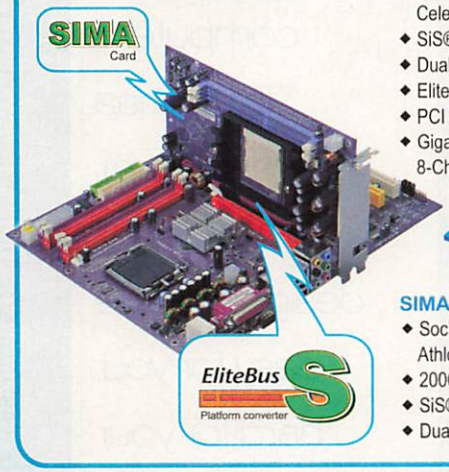
nVIDIA nFORCE 4 SLI

PF88



- Socket LGA775 Intel® Pentium 4 / Celeron CPU
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- Dual Channel DDR 2
- Elite Bus slot
- PCI Express x16 and x1
- Giga LAN, IEEE 1394a, Serial ATA, 8-Channel Audio

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IOC Instant Overclocking Controller

SIMA A9S Card

- Socket 939 AMD Athlon™ 64/ Athlon™ 64 FX CPU
- 2000/1600/1200/800/400 MT/s
- SiS® 756
- Dual-channel DDR

PF5 Extreme

PF5 EXTREME

intel

Dual Core

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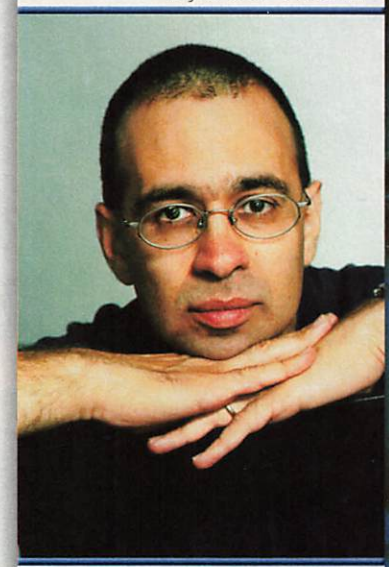
Another Assortment Of Free & Open-Source Stuff

by Pete Loshin



Pete Loshin, former technical editor of software reviews for Byte Magazine *(print version), consults and writes about computing and the Internet. He also runs www.linuxcookbook.com. He owns shares of both Microsoft and Red Hat and believes that Windows isn't for everyone, but neither is Linux.*

Another "news of note" sampler this month. First, good and bad news for Microsofties: How nice would it be to have Windows XP distros optimized for different tasks? You could get all the service packs and security patches preapplied or load up a streamlined XP toolkit for forensics and system repair. Specialized distros are old hat for Linux, but now you can get special Windows distros—from pirates. Joel Johnson of *Wired* reports on the illicit WinXP distro downloads (Aug. 23, "Windows Got Ya Down? Try a Remix"; wired.com). If you'd rather stay legal, just check out one of the multitude of Live CD Linux distros, such as Knoppix (www.knoppix.net).

Speaking of getting software, open-source software is only literally free if you've already got fast, reliable (and expensive) Internet access to download gigabytes of data to burn to CD or DVD. Enter Mark Shuttleworth, whose Ubuntu Linux distro (www.ubuntulinux.org) has been winning raves. Shuttleworth's Freedom Toaster (www.freedomtoaster.org) is a self-contained "Bring n' Burn" kiosk dispensing various releases of a dozen popular Linux distros, including Slackware, SUSE, Knoppix, Mandrake, and of course, Ubuntu, plus FreeBSD, as well as open-source programs that run under Windows, such as OpenOffice.org, Firefox, and more. Although currently only in South Africa, the Shuttleworth Foundation is taking Freedom Toasters requests for locations globally.

And some great news for SUSE fans: Not only does Novell publish the only commercial distro that you can still count on finding for sale in the big box stores, but it's opening it up with the openSUSE project (openSUSE.org). When Red Hat went uptown and started selling to the enterprise market, it left SUSE the Linux shelf at Staples and CompUSA. Red Hat's open Fedora project (fedora.redhat.com) makes a RH-based distro available freely, so nonenterprise users can try technologies intended for the commercial product (such as Red Hat's testing lab/beta program). openSUSE will be sort of like that, only oriented more toward desktop users, and Novell will continue to sell the shrink-wrapped distro.

Tired of being humiliated by your chess-playing computer? Try Arimaa (arimaa.com), a new game designed to be easy for you, hard for your computer. You can play Arimaa in meatspace with a chess set or online with other real human opponents at the Web site. What makes it interesting to the open-source community is that Arimaa uses an in-between approach to licensing that reflects a sense of fairness: You can't profit off the game without a license, but otherwise it's free for personal and not-for-profit uses.

Finally, Apple and Intel are sitting in a tree, K-I-S-S-I-N-G. Does this mean you'll be able to run any OS you want on your favorite, de facto standard Wintel PC? I don't know for sure, but despite the fact that Apple sells hardware, Apple is really a software company. You're just forced to buy its hardware to run its software. Kind of like IBM used to be 40 years ago, where you bought its hardware and got its software bundled, essentially free.

But now, even though Apple's going to start using Intel chips for new Macs, it tells us that Mac OS X will still only be sold for and run on Macs. So you shouldn't be able to run Mac OS X on your Intel PC.

OK. Here's the thing: I was surfing and found stuff like xplOde's Mac OS x86 project (www.xplodenet.com) and the OSx86 Project (www.osx86project.org), where folks are claiming they can run Mac OS X on their PCs, and they're blogging all about the latest tips and tricks for getting Mac OS X to run on Intel systems, which I think is really cool because I've never liked Mac hardware but always wished I could run the OS on a standard PC.

Does it really work? I dunno. Will Apple let it continue? <shrug> Can Apple go on selling overpriced hardware to the relatively small market of people willing to pay for it just to get the Mac OS? Could Apple possibly compete against Microsoft in the Intel PC market, or would it get squashed like a teensy, little bug? Don't ask me, cuz I don't know, but stay tuned because I think we're all going to find out. ▲

Are you tired of being humiliated by your chess-playing computer? Try Arimaa (arimaa.com), a new game designed to be easy for you, hard for your computer.

You can get saucy with Pete at pete@cpumag.com.

The Changing Face Of BitTorrent

Is BT The Next HTTP?

BitTorrent, it's time for your close-up. Bram Cohen and BT are ready to go Hollywood. A recent Supreme Court ruling against Grokster made file-sharing networks liable for piracy if they at all encourage copyright infringement among users. But Cohen has opposed illegal downloading with BT and is now shopping BT around to the major movie studios as a next-generation method for efficiently distributing time-shifted media, VOD, and perhaps even digital cinema. As Cohen works the corner offices of Hollywood, many of his progeny, Azureus (Aelitis), WinMobile Torrent (Adisasta), and Atzio are hoping to make BT and similar file-swarming distribution approaches a Web-altering technology. Even Microsoft has taken notice and plans to launch its own enhanced protocol code-named Avalanche. That old tech "revolution" rhetoric is starting to heat up as some think BT could be the next HTTP.

The Big Disruption

In some ways BT already is as big as HTTP. In 2004, UK research firm CacheLogic estimated that 35% of all Internet traffic involved torrent downloading. "BitTorrent could be one of the most disruptive technologies in the next few years," say Gartner analysts Stephen Prentice and Mike McGuire in their recent recommendations to digital publishers. BT eliminates the need for huge central content servers and reserves huge bandwidth overhead in order to distribute large files to multiple downloaders. By dispersing the files and bandwidth among hundreds and thousands of peers, BT's file-swarming technique circumvents these costs and makes feasible Internet distribution of multigigabyte files.

Furthermore, BT could make possible the longtime dreams of video rentals coming directly to your living room media center via broadband pipes. It could eliminate the need for software distributions via physical media. For instance, Linspire now distributes its Linux OS via a torrent, which users can burn directly to a CD. Prentice and McGuire advise big business to embrace and help legitimate this favorite technology of film and TV piracy.

Linspire already uses BitTorrent as a way to distribute and update its Linux OS.

Big Business

In fact, French company Aelitis makes one of the most popular BT clients, Azureus, but it's focusing much of its attention on professional versions of the program for publishers and the enterprise. According to CEO Olivier Chalouhi, between 1 and 2 million people download Azureus, but he plans to make much of this by "solving the data distribution problem," he says. "It ranges from companies who use it internally to distribute software and document updates to their local branches around the world to companies delivering new services over the Internet like music stores and Internet TV." Aelitis will soon announce some of these alliances that will use the BT protocol to manage massive next-gen content distribution. "It will be the same for publishers to publish things using BT as HTTP, and users won't see any difference. The only difference is that publishers won't have to care about bandwidth."

Serving Web pages and even low-res video streams from a server-based technology was acceptable for the first decade of Web use, but as companies see a future of running enormous media projects over the Internet backbone, the material and bandwidth costs of old-school technology become prohibitive. Relieving bandwidth constraints opens up new possibilities for content. Entire TV stations could move from broadcasting to millions of users over the air to distributing these same shows to an even wider audience online.

An Avalanche Of Ideas

Launching sometime in early 2006, Technology's (www.atzio.com) Peer-to-PeerTelevision will use a modified BT client to send highly personalized TV programming to set-top boxes and home media servers. Subscribers will choose their shows, and the Atzio client will download the torrents in the background from media companies and reassemble them in an Internet Media Receiver in the home that will play back the content on TV or PC. Even more important, file-swarming efficiencies let virtually any content provider, large or small, circumvent the limited and costly distribution systems of cable TV services or film distribution

ATZIO
www.atzio.com

Atzio's Peer-to-PeerTelevision will use its own variation of BitTorrent to download on-demand film and TV directly to a PC or a set-top box.

Q&A

Yongki Andyka, President, Adisasta

In the West, BitTorrent may signify viable VOD for consumers and more efficient corporate intranets, but halfway around the world, priorities are different. Mobile software developer Yongki Andyka, president of Adisasta, is based in Bali where BT has political implications; namely freedom from censorship and more equal access to bandwidth. His company has developed WinMobile Torrent for use in PocketPCs and Microsoft-enabled Smartphones

CPU: Beyond its more efficient use of bandwidth, do the BT protocol and clients like yours open up new ways of distributing information?

Andyka: With WinMobile Torrent, getting information now becomes so decentralized, easy, and mobile that censorship of certain Internet IP, as practiced in certain countries, will have no effect on mobile users who would like to access the information once it's available as a torrent file. In a sense, BT shifts the Internet back to its initial purpose, decentralized networks, as opposed to the Web, which is more of a centralized solution to information dissemination. Integrity and hash checks along with distributed peers make it impossible to tamper with or censor the information being transferred. The implication of BT's widespread use will make the Internet more powerful for everyone.

CPU: Does this protocol also help decentralize the Internet even further?

Andyka: Decentralized networks are essential to the Internet's existence, and the BT protocol is the key player now. Bloggers, podcasters, and other innovators to come need to disseminate vast amounts of information, but they have budget constraints. They will eventually find BT to be the solution.

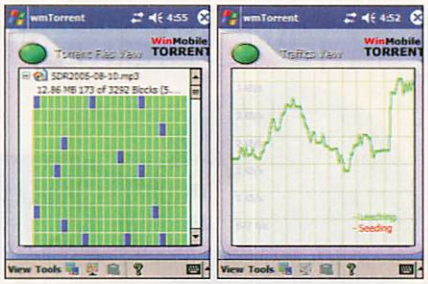
CPU: Does a mobile version of this protocol have inherent advantages over PC-based BT clients?

Andyka: It's interesting that mobile technology is kind of leap-frogging [Desktop technologies] in the developing world. The BT protocol may have significant advantages in a nation like Indonesia, for instance, where flat-rate GPRS Internet connections are gaining market share at a reasonable cost. 3G technology is coming in while so many areas are still unreachable by cable and wire networks.

and go straight to the consumer. By placing a media file into Atzio's file-swarm network rather than on its own servers, any Web site could become a TV station with minimal hardware overhead.

On the other end of the spectrum, Balinese developer Adisasta (www.adisasta.com) thinks the future of BT may lie in the user's hand with a WinMobile Torrent client that works on PocketPCs and Microsoft-powered smartphones, even over cellular phone networks. As PDAs get hard drives and phones use flash memory storage, Adisasta president Yongki Andyka envisions a world in which everyone can publish data from anywhere regardless of bandwidth or local censorship fears.

Although Microsoft may not share Andyka's vision of a decentralized world community of authors using BT, it did reveal in May that its own file-swarming method, Avalanche, will improve on the BT approach. According to researcher Pablo Rodriguez, Avalanche will use larger blocks of contiguous file segments that have more information about the entire file structure (network coding) so that swarm-style downloading will be even more efficient than BT. Also, the first documents on Avalanche reference its application for digital film and TV, TV on-demand, movie and music downloads, and podcasting, as well as a means for distributing software code.



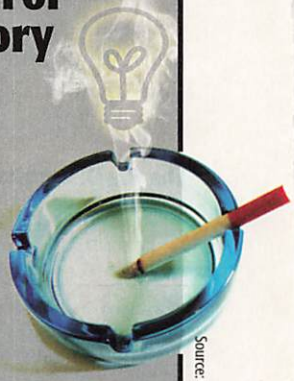
Adisasta's WinMobile Torrent lets a PocketPC, and eventually mobile phones, create and distribute torrents for sharing any image, video, or document.

With Bram Cohen and BitTorrent courting the major media and Microsoft making its usual vaporware claims, the classic new media David vs. Goliath contest seems to be heating up yet again. By this time next year, the buzz of the Internet may be over whose swarming protocol controls what many are starting to call the "third channel" of Internet distribution after HTTP and IPTV. CPU

by Steve Smith

Infinite Loop

Marlboros For Your Memory

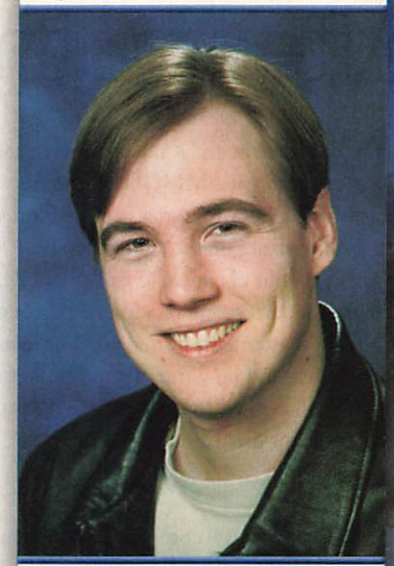


Turns out cigarettes *are* good for something. It's definitely not your lungs or your breath; it's something you may not be thinking of: your memory. Nicotine enhances particular nerve cells (nicotinic receptors) in the brain and can improve cognition. Biopharmaceutical company Targacept has taken this knowledge to the lab and developed a compound called ispronicline that can be given to patients to produce the desired effect, sans carcinogens. They've tested it on elderly patients, and people with Alzheimer's are up next. So apparently lighting up isn't all bad. ▲

Source: wired.com/news/medtech/0,1286,68712,00.html?tw=wn_tophead_3

google.txt

by Rob "CmdrTaco" Malda



Rob "CmdrTaco" Malda is the creator and director of the popular News for Nerds Web site Slashdot.org. He spends his time fiddling with electronic gizmos, wandering the 'Net, watching anime, and trying to think of clever lies to put in his bio so that he seems cooler than he actually is.

From its early years as the search engine of choice for power users, to its explosive rise into public awareness, market dominance, and its IPO Google search, Google has slyly moved from beyond the simple Web search that its name has become synonymous with. Furthermore it's been leveraging that brand awareness to move into a variety of new fields. And with its pockets now bursting with that new-found, gone-public cash, what's to stop it?

In the early days, Google acquired a handful of properties: Blogger, Flickr, and orkut, which represent three interesting types of data. Flickr lets individuals put pictures online. Blogger lets individuals put words online. These individuals become publishers sharing their words and images with the world at large with little or no cost to themselves.

The social network of orkut is still a strange beast. It's part phone book, part popularity contest. Although it hasn't held up particularly well over the years, the concept is critical to the future development of the 'Net. In the upcoming years, recommender systems will be at the core of the online experience. Today what is Google except a recommender system based on software algorithms and gigantic databases? The concepts developed from orkut could make it possible for us to bridge the gap between the recommendations of software and those of our friends.

Furthermore, Gmail is also unusual at first glance but most logical after you think about it. Google makes serious bank off its AdSense system. Moreover that system works by reading what you read and closely matching ads with content. Anyone who works in advertising knows that the single best way to make your ad successful is to put it in front of someone who has a chance of being interested. And what is of more interest to the individual than his email? If your buddy emails you to tell you about a cool concert, and the ad on the page offers to sell you tickets to the next show, the click-through rates would be astounding.

The privacy implications of these services are huge. So far Google appears to be working hard to guarantee anonymity and protect the individual privacy of a user. This leads us to the new kid in the Google services family, Google Talk.

Google's no frills instant messaging offering is now in beta. IM is a unique creature online. AOL, Yahoo!, and MSN each offer an IM system. I have accounts on those and others, and keeping track of all of them is a royal pain. Systems such as Jabber aim to bridge the gap among these services with mixed results. But Google has a policy designed to try to bridge not only these textual services together, but also to bring together VoIP chat services, as well. With the huge incompatible networks of Skype, iChat, and others already available, Google's pledge to provide a junction for these systems is very significant.

Of course all of these tools are in various states of beta or relatively disconnected from each other. But it's not very difficult to start seeing how the pieces all fit together. Google's orkut is not very far from an address book. And because anyone in the Googleverse will be using Blogger and Flickr, you'll be able to learn all about your shared interests (all the while seeing highly targeted advertising). After perhaps an email introduction, you can use Talk to get to know someone more personally. Or use his or her knowledge to get more accurate recommendations from the Google search.

Imagine searching for your favorite musician and then Google telling you that your buddy Joe likes that artist, too. And Joe also likes this other artist. So you're given Joe's contact information and shown a link to buy the CD.

The parts are there. All that remains to be seen is how Google will try to put them together. And remember that Microsoft is trying to do exactly the same thing. ▲

And because anyone in the Googleverse will be using Blogger and Flickr, you'll be able to learn all about your shared interests.

Contact me using good old-fashioned non-Gmail at malda@cpumag.com.

Aftermath

by Joan Wood

No, this "aftermath" is not a sequel to some post-apocalyptic MMOG. As the days following hurricane Katrina smacked the United States into realizing that it can happen here—things did get out of control on an epic scale, and it appears that scores of additional lives were lost—the real aftermath from natural or man-made disasters and how Internet technology has been and will be used to benefit survivors is the chosen topic for discussion this month.

The Missing

Neworleans.craigslist.org was probably one of the first sites users accessed to get messages out to loved ones and post missing persons reports. This is a strong indication that the user community for a given site will reach out to something familiar first. The ICRC runs a Family News Network Web site (familylinks.icrc.org/katrina) to register the missing and the safe. More than 65,000 names were registered there in the week after landfall, and data on the site is being transferred to the Red Cross site for ongoing support.

KatrinaList.net probably has the largest number of missing and found persons entries (more than half a million) because they have data mined all the other lists. As advocates of a common database, the site also offers a link to the PFIF (People Finder Interchange Format) specification, an open-source format that, if widely adopted, could facilitate aggregating information from multiple databases. Likewise, Yahoo!'s Katrina: Search For Missing People and Google's Hurricane Katrina Search For People tap into multiple missing persons databases to provide more comprehensive results.

KatrinaSurvivor.net includes a very useful feature that the Red Cross might want to look into: email alerts for any items posted to the site that include the last name of the missing person. Repurposed technology from auction sites (fotoads.com) posting free ads with photos of missing and found people and personal belongings requires one to overlook the layout designed for commerce and focus on the content offered.

Blues For Katrina (bluesforkatrina.com) was launched in cooperation with The Tipitina's Foundation (named for the famous New Orleans club Tipitina's) to coordinate efforts by and for artists and musicians displaced by the hurricane with forum postings on everything from benefit shows and fundraisers, T-shirt sales, and musician housing and relief assistance, to loaner instruments. Furthermore, VolunteerMatch.org coordinates hooking up those who want to support relief efforts and organizations needing volunteers.

News Blogs

As did other news organizations, MSNBC launched Katrina Blog (katrinablog.msnbc.com) and staffed it with veteran journalists and multimedia producers traveling through the destruction zone. Eating prepackaged food and sleeping in shelters, they provided a running first-person, ground-level commentary on the state of wherever they found themselves. And the blog format allowed these journalists the subtly shocking freedom to write as human beings, as well as journalists.

Future Technology

A goal for next time is to reduce loss of life and property by providing instantaneous information access to first responders, emergency planners, and civilians through a network of solar-powered and hand-cranked handheld, wireless devices with ad hoc wireless networking GSM (or G3) technology, as well as GPS. Interactive, detailed, real-world 3D location databases are the foundation, but how to get a complete baseline of accurate details for local databases created and distributed and then updated in real time with current conditions is the real challenge.

Google Earth is a example of the current state of this technology. Only a few weeks after Katrina, users have worked with the Google guys to add layers of post-damage overlays to the existing Gulf Coast database imagery (earth.google.com/katrina.html). Further development could speed up the process of making up-to-the-minute data available, but the detailed databases themselves are another issue.

Having delved heavily into the potential of location-aware gaming in the past few years, I strongly believe that is where the right mix of optimization, price point, creativity, and tenacity will come together to solve this problem. Stay tuned. . . . ▲

As founder and president of indy game developer Mango Grits, she talked 3Dfx out of prerelease Voodoo hardware to develop flying game Barrage for Activision then co-founded and ran hardware review site SharkyExtreme.com as managing editor. She currently plays with small, wearable PCs and big, rack-mount visual simulation image generators for Quantum3D while secretly plotting to save the world through a series of international location-aware multiplayer handheld games.

. . . users have worked with the Google guys to add layers of post-damage overlays to the existing Gulf Coast database imagery.

For more information contact joan@cpumag.com.

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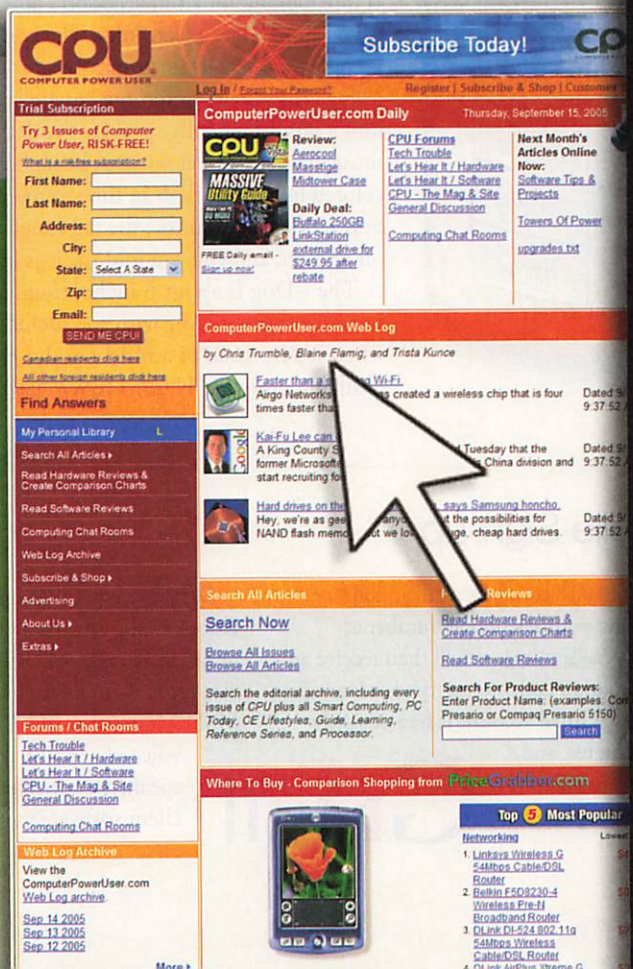

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ROAD Warrior

Motorola & Apple Release iPod Cell Phone

Motorola and Apple joined forces to release the ROKR in early September, essentially creating a mobile iPod phone. ROKR, the first iTunes-enabled cell phone, puts some impressive features into a body 4.25 x 1.81 x 0.8 inches (HxWxD). The phone comes bundled with a 512MB flash card that holds about 100 songs, and there's an integrated stereo speaker and stereo headphone/headset combination that plugs into a port on the top of the phone.

To load songs in the phone, you must transfer tunes from a computer with an included USB 1.1 cable. A wireless option for purchasing music isn't available. Users can expect approximately nine hours of talk time and nine days of standby time. Music playback automatically stops when an incoming call is received, although you can send and receive text messages while listening to tunes. Additional features include a color screen and a built-in camera. The ROKR, $250 with two-year contract, is available exclusively through Cingular Wireless in the United States. Plans for worldwide availability had not been determined at press time, although plans to offer the phone in Canada, Mexico, Europe, Australia, and Singapore had been announced.

If you already own an iPod, or a portable music player from another manufacturer for that matter, and you're looking for a fun accessory, take a look at the i-Dog from Tiger Electronics. The company typically manufactures small electronic toys for children, but the i-Dog crosses over into more "useful" territory. The unit's ears are actually speakers that let you hear the music on your player without headphones. The i-Dog's head also has a variety of colored lights that flash in time to the beat. Additionally, the head and ears move in reaction to the music; the tail functions as a toggle to turn the stereo speakers off and on; and you can fold the legs in various positions.

The i-Dog is about 6 inches long, and you can connect it directly to any portable music player with the included cable. The unit will also move about when it's in reach of ambient audio from a stereo. The i-Dog ($29.95) is available online at Hasbro (www.hasbrotoyshop.com). ▲

Gmail Offers Mobile Sign-up

You can now sign up for a Gmail account for your mobile phone. You just need to enter your telephone number at www.google.com/accounts/SmsMailSignup1. You'll then receive an SMS text message with a confirmation code necessary to create your free Gmail account. Although the Gmail account is free, it's only available for now in the United States, and your provider may charge you to receive text messages, so check your service plan.

When you get that Gmail account, you can also use it to access Google Talk, the instant messaging beta the company recently released. Google Talk functions as a hybrid instant messaging service for real-time text-based chat, similar to Yahoo! Messenger, MSN Messenger, and AOL Instant Messenger. The app also has voice-chat ability, which requires having a microphone and speakers connected to your system. You can download the client software at www.google.com/talk/about.html. ▲

Life After Hurricane Katrina

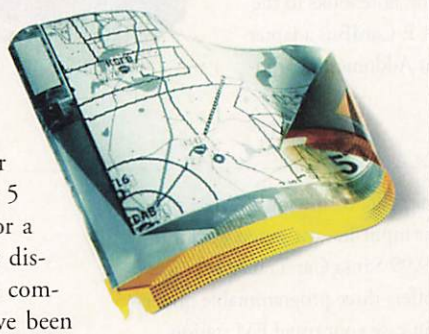
The devastation that Hurricane Katrina left behind was so widespread it's nearly impossible for officials to predict just how long it will take to rebuild cellular networks in the area. The loss of infrastructure and a lack of power in large areas were preventing even undamaged equipment from operating after the storm. Many users could make calls but not receive them, while others found that text messaging (which requires less bandwidth) was the only means of reaching the outside world.

While it will take many months for cellular companies to fully recover, sales of satellite phones were surging after the hurricane. Satellite phones, typically used by governmental and military officials, are larger, heavier, and more expensive than cell phones. Air time can cost as much as $1.50 per minute with a satellite phone, but it can make calls in disaster areas where cell phone infrastructure has been largely destroyed. Satellite phone companies, such as Globalstar and Iridium, reported that traffic surged to as much as 30 times the normal level after Hurricane Katrina.

In related news, the FCC was reportedly stepping in to ensure that cell phone providers didn't cut the service of hurricane victims. In addition, some organizations and charities were collecting mobile phones to help victims. Once such group is the nonprofit Recycling for Charities (www.recyclingforcharities.com), which is collecting donated mobile phones, PDAs, digital cameras, and iPods. The proceeds were slated to go to American Red Cross. ▲

Readius Concept Device Features Flexible Screen

Philips Polymer Vision recently unveiled an experimental handheld device that features a flexible 5-inch display. The monochrome screen displays text and images at 320 x 240, which is slightly lower that what most modern Palm and Pocket PC handhelds offer. The innovation with this handheld is obviously the flexible display, which a user can roll up to a width of about 1 inch or stretch out to a maximum of about 5 inches. The prototype was created for a trade show in Berlin to exhibit the display's ability, but unfortunately, no commercial applications or products have been announced as of yet. ▲



Vonage's VoIP Service Tops 1 Million Subs; Skype For Sale?

Internet telephone service powered by VoIP technology has proven extremely popular with users, and it keeps on growing. Vonage, one of the most recognizable companies offering VoIP service, recently announced it reached the 1 million subscriber mark. In honor of reaching the milestone, the company is sponsoring a Thanks A Million sweepstakes contest, with prizes including such items as free Vonage Internet phone service, cash, Amazon.com gift certificates, iTunes song downloads, and 1 million frequent flier miles.

Vonage's VoIP service plans start at $14.99 a month for 500 minutes. There's also a Premium Unlimited option, which provides unlimited calling in the United States, Canada, and Puerto Rico for $24.99 a month. For more information about Vonage's sweepstakes, which runs through Dec. 31, go to www.vonage.com.

In other VoIP-related news, recent reports that suggested eBay was in talks with Skype to purchase the company turned out to be true. In early September, eBay was reported to have struck a $2.6 billion deal to buy Skype, the free Internet telephone service available for Windows, Mac, and Linux users, as well as the Pocket PC platform. The main attraction for eBay? Skype's 53 million users. Previously, Microsoft, News Corp., and Yahoo! were rumored to be interested in buying Skype. ▲

Verizon, HP & Dell To Offer New Wireless Notebook Technology

Just as we headed to press, Verizon, HP, and Dell announced that they were joining forces to embed a new wireless technology into notebooks that will let users access the Internet via Verizon's high-speed wireless data network. The technology will offer users an alternative to using Wi-Fi hot spots, which can be hit and miss. Lenovo, which bought IBM's notebook line, is also reportedly in on the deal. Reports are that we should see notebooks with the technology appearing next year.

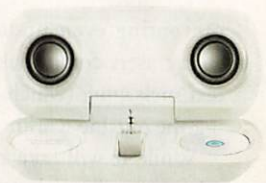
The feature will rely on Verizon's EVDO broadband network, which will offer cable modem- and DSL-like speeds. Verizon currently offers the V620 PC card for high-speed mobile access. ▲

by Marty Sems

Merry Mobile Gift Ideas

Do you have a little Road Warrior on your Christmas shopping list? Well, if you're in the need of some mobile gift ideas, here are a few good ones.

Creative TravelDock 900



The pretty white face may connote iPod, but the TravelDock 900's pedigree says Creative. This $169 speaker dock actually connects to any personal music player with a standard mini-plug output. Dual NeoTitanium micro drivers pump out up to 4 watts RMS, enough for close quarters. The 900 can run on AAA batteries, but when it's paired with an AC adapter, it can recharge an iPod Shuffle. Other recent creations from the Labs include the four-speaker, $249 TravelDock Zen Micro with remote; the $129 TravelSound 400 with swiveling speakers; and the compact, $89 TravelSound 250.

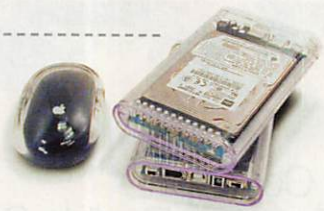
Belkin Wireless G Travel Router

It's a happy fact that most better hotels offer wired broadband now, but travelers may find wireless access to be slow or nonexistent. Belkin's new F5D7233 ($79.99) can fill the "last meter" gap. This tiny 802.11g router offers WPA and 128-bit WEP security, plus the expected backward compatibility with 802.11b. It's perfect for sharing a connection during those hotel room collaboration sessions.

Sony Walkman Bean

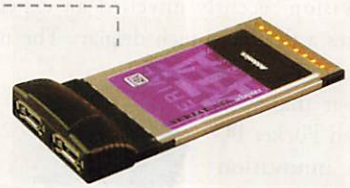
We'd gladly trade the family cow for this magic bean. Funky colors and a lightning-fast recharge time mean that several people on your holiday shopping list will want Sony's new Walkman Bean in their stockings. It plays a few other audio formats besides MP3, but not iTunes' AAC nor copy-protected Windows Media files. Sony sells the Bean in 512MB ($129.95) and 1GB ($179.95) varieties, but to date, it has refused to swap us one for the aforementioned cow. Scrooges.

Other World Computing 120GB Mercury On-The-Go



The Macolytes at OWC offer some really interesting external drives for Apples and PCs. This one crams 120GB into a form factor commensurate with 2.5-inch drives, and it's tapped for both FireWire 400Mbps and USB 2.0. The drive inside this Tiger-compatible Mercury On-The-Go spins at 5,400rpm and carries an 8MB cache. All that capacity and speed in such a small package makes it easy to understand why the price tag reads $349.99.

Addonics CardBus eSATA Adapter



Faster than USB 2.0. Even faster than FireWire 800Mbps. The new eSATA interface takes 1.5Gbps SATA outside the box to deliver data as fast as external hard drives can supply it. Addonics is helping to link existing notebooks to the upcoming generation of eSATA drives with the ADCB2SA-E CardBus adapter ($49.99). It's compatible with the metal retention clips that Addonics incorporates into its eSATA cables' connectors.

SanDisk Sansa Car Transmitter

So you've "thought different" and shown your nonconformist side by buying an MP3 player that isn't an iPod. Now mate your SanDisk Sansa to your input-less car stereo with this new FM transmitter. Featuring a flexible steel neck, the $59.99 Sansa Car Transmitter lets you adjust the player's position wherever you like. It even offers three programmable preset buttons for any frequency in its 88.1 to 107.9MHz range, in case your usual FM station gives you static some morning.

THREE QUESTIONS YOU SHOULD ASK BEFORE YOU DECIDE WHERE TO BUY RAM...

Can you guarantee your RAM will be compatible with my system?

Use the Crucial® Memory Advisor™ tool, and we guarantee that our memory will be compatible with your system, or we'll refund the price of the incompatible module.

The Memory Advisor is an online tool that contains detailed information about more than 110,000 upgrades for more than 20,000 PCs, including many older systems. Our database is so specific that we know more about the memory in your PC than your computer manufacturer (OEM) does. The information comes from our close working relationship with OEMs and from the Crucial Compatibility Lab, where our certified lab technicians perform tests on nearly 3,000 different motherboards.

The Memory Advisor is surprisingly easy to use. Simply tell us in just three clicks the make and model of your system, and we'll tell you which upgrades are compatible. Or, use our System Scanner tool to automatically scan your system configuration and get a list of compatible upgrades.

Do you actually make the memory chips you sell?

Other memory companies may claim to manufacture memory, but what they actually do is just attach chips to a memory module—someone else makes the chips.

Why does it matter? Quality. Those other guys buy the cheapest chips they can find—often chips that haven't even been individually tested to make sure they'll work in your PC. If you install inferior memory, your computer might not boot. Or it might seem to work fine at first, but later experience mysterious crashes and error messages.

Crucial is the only consumer memory upgrade supplier that's part of a major DRAM manufacturer—we're backed by 27 years of Micron expertise. In fact, because the world's leading computer manufacturers rely on our high-quality RAM, chances are good that the OEM memory in your system came from Micron. Crucial brings this same high-quality memory directly to you. It just costs less because you don't pay middleman mark-up fees.

What kind of support do you offer if I have questions?

We offer superior customer service right from the start. The Memory Advisor tool is so easy to use that most customers find exactly what they need on their own, but if you ever do have a question, we make it easy to find fast, free answers. You can call us directly, e-mail us, chat with a live Expert Online, or learn on your own with our vast library of articles and FAQs.

And our free tech support really is free. Our certified support agents are true Memory Experts℠, averaging 15 hours of technical training each month and 20 hours a month "hands-on" in the Crucial Performance Lab. We don't keep you waiting when you have a problem—the average hold time (over a six-month period) is just over one minute, and the average time spent resolving an issue by phone is about three minutes.

Crucial is the answer.

When you compare Crucial's quality, low prices, and superior support to our competitors, it's no surprise that our great customer ratings from September 2003 through August 2004 earned us a "Circle of Excellence" Platinum award from BizRate.com (October 2004). In fact, from July to September 2005 we scored 96 percent in overall customer satisfaction. Join the millions of customers we've successfully served over the Internet!

Exclusive offer for Computer Power User readers!

Visit Crucial today, and in just three mouse clicks, get your FREE memory upgrade advisor report for your specific computer. And, for a limited time, **Crucial is offering Computer Power User readers a special DISCOUNT coupon.** Find the right memory for your system in just seconds (and get a great deal) by visiting:

www.crucial.com/cpumag

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The Memory Experts℠

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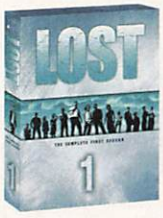
At Your Leisure

The entertainment world, at least where it pertains to technology, morphs, twists, turns, and fires so fast it's hard to keep up. But that's exactly why we love it. For the lowdown on the latest and most interesting releases in PC entertainment, consoles, DVDs, CDs, and just leisure and lifestyle stuff we (for most part) love and recommend, read on.

Audio Video Corner

DVDs by Samit G. Choudhuri, CDs by Blaine A. Flamig



Lost: The Complete First Season

A plane crashes in somewhere in the Pacific ocean stranding 48 survivors on an island. However, there's more to the island (and the key characters) than meets the eye. The show's excellent pacing as the various plots and mysteries are unraveled make viewing quite addictive. Along with "24," this is one of the best shows on broadcast television today. The first six discs contain every episode, and you can find a bounty of extras on the seventh.

$59.99
Buena Vista
abc.go.com/primetime/lost

Crash

Director and writer Paul Haggis is going to be in high demand. Remember his name because you'll be hearing a lot more of it. This provocative film guarantees that. "Crash" ends up as one of 2005's most powerful American films. In fact, it's probably the strongest film we've seen this year. The ensemble cast does an excellent job of drawing you into the racial conflict (set in Los Angeles), and you will *feel* emotion and conflict as the film rolls toward its finale. Don't miss this seriously good movie.

$28.95
Lions Gate
www.crashfilm.com

Rolling Stones —"A Bigger Bang"

Who gives a damn how old The Glimmer Twins are? "A Bigger Bang" proves they still have the touch, and we couldn't be happier. Before "A Bigger Bang," you had to pull 1981's "Tattoo You" off the shelf to find a Stones' album not littered with at least a few clunkers. The 16 tracks Mick and Keith turn out here, though, are top-to-bottom back-alley, blues-soaked rockers and ballads filled with the snarling vocals, scatter-shot riffs, and back-to-the-basic rawness that made the Stones great in the first place. Now if they would just do something about those ticket prices. . . .

$15
Virgin Records
www.rollingstones.com

Sigur Rós —"Takk"

You probably won't understand a word Icelander Jon Thor Birgisson sings on "Takk," but that won't deter you from getting lost in the otherworldly beauty that is Sigur Rós. Less bleak than 2002's "( )" or as majestically gripping as 1999's brilliant "Ágaetis Byrjun," "Takk's" songs are drenched in bright-eyed innocence that's joyfully addicting. Floating over a seas of drums, guitar, strings, and enchanting vocals, "Takk's" songs are shorter that past albums', but they still build ever-so-slowly into small explosions of energy that carry you away to a better place.

$15
Geffen Records
www.sigurros.com

See the full reviews from A/V Corner at www.cpumag.com/cpunov05/AYL.

DVD Byte

Oct. 11, 2005

Kingdom of Heaven
Unleashed
Kicking And Screaming

Oct. 18

Batman Begins
Batman: Motion Picture Anthology 1989-1997
The Big Lebowski (Collector's Edition)

Oct. 25

Titanic (Special Collector's Edition)
A Bridge Too Far (Collector's Edition)
Tripping The Rift: The Complete First Season

Nov. 1

Star Wars Episode III: Revenge Of The Sith
Millions
Office Space (Special Edition)

Nov. 8

Charlie And The Chocolate Factory
Blue Collar TV: The Complete First Season
Live 8

F.E.A.R.

FIRST ENCOUNTER ASSAULT RECON

A Monolithic Success

Developer Monolilth has created a first-rate title inspired by likes of "The X-Files," "The Ring," and S.W.A.T. You enter the game as a soldier in an elite, top-secret Special Forces unit, which specializes in paranormal activity. The unit needs your assistance to put down a psychic uprising of sorts. Not to worry, this relates to the bigger plot points that are unveiled throughout the game.

Your character can put forth bursts of incredible speed, which is portrayed by the slo-mo mode you can use to dodge bullets and/or put down a roomful of nasties. It doesn't take long for paranormal activity to begin, and you'll quickly discover yourself knee-deep in first-rate FPS action as you move toward your objective with fright and butterflies in your stomach.

The all-new graphics engine is superb, and F.E.A.R. makes realistic use of in-game physics. Put it this way: Half-Life 2 and Doom 3 have nothing on this engine.

F.E.A.R. comes on CD or as a Director's Cut on DVD-ROM, which includes a making-of piece, machinima episode from the creators of "Red vs. Blue," and more. Don't miss out on this game. ▲

$49.99 • ESRB: M(ature)
VU Games • www.whatisfear.com

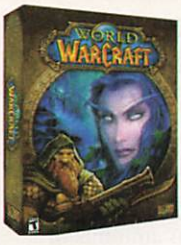
BLACK & WHITE 2

The Choice Of Good & Evyil

Back in early 2001 Lionhead Studios released the highly anticipated Black & White. The game featured some clever AI, but was more of a toy than a game. Famed developer Peter Molyneux acknowledged some shortcomings and set to work on a sequel that would focus more on entertaining gameplay. In Black & White 2 players will finally have missions and objectives that require thoughtful, strategic planning. And the game looks beautiful to boot.

Having goals helps the game's overall structure. You again step into the shoes of a god to rule the people in your land. As an ambitious deity, you're not content being a small fry, and your goal is to increase your sphere of religious influence. To accomplish this you must increase the population of your people so you can convert other civilizations. The open-ended aspect is in the how. So far you have your typical resource-gathering/growing Civ-style game, but it's your in-game creature avatar that brings the game's much ballyhooed AI to the forefront. You can train your creature to support your people. Thought bubbles give you feedback on the creature's development; watching an AI construct forming a character based on your actions is compelling. B&W2 is the game B&W should have been, and we're glad to finally be able to play the game Molyneux originally intended. ▲

$49.99 • ESRB: (T)een
Electronic Arts • www.lionhead.com/bw2



World Of Warcraft

We placed World Of Warcraft as first runner-up to Half-Life 2 as top PC game. We're still playing WoW while HL2 languishes on a shelf, which is a testament to Blizzard's top-notch design and talent. The game's content and population continues to grow with gusto. WoW is not just a game—it's an addiction. ▲

$49.99 • ESRB: (T)een
Blizzard Entertainment
www.worldofwarcraft.com

Age Of Empires III

AOE2 was released in 1999 (with an expansion pack in 2000) and was followed by Age Of Mythology in 2002, so it's no surprise that fans of the series are excited about Age Of Empires III, which now enters the colonial age. It's more of the same high-quality stuff but with additional tweaks that have a positive impact on overall gameplay. ▲

$39.99 ($69.99, Collector's Edition) • ESRB: (T)een
Microsoft
www.ageofempires3.com

Warhammer 40,000: Dawn Of War—Winter Assault

This expansion pack is an add-on Dawn Of War. Unlike many expansions that are targeted at more advanced players, Winter Assault provides a friendlier learning curve along with the new Imperial Guard race. You can get the original title for bargain-basement prices, and it's highly recommended to RTS gamers. ▲

$29.99 • ESRB: (M)ature
THQ
www.dawnofwargame.com

FARCRY INSTINCTS

A Feral Experience

Last year we trumpeted the Crytek's graphically stunning Far Cry. Unlike the typical dark, dingy shooters, Crytek created a sunny, green island paradise with gorgeous vistas and lapping waves. The game wasn't just beautiful—it was interesting. The enemy AI wowed us and gameplay was not completely linear as seen in so many other A-list FPS titles. With that, then, it comes as no surprise that the game became an uncontested PC hit.

Far Cry Instincts is the console version that Ubisoft Montreal was working on for release late last year, but the game was pushed back. The final product looks very, very good considering the difference in hardware between the Xbox and PC. The game is less open-ended than the PC version because of hardware limitations, but Instincts follows the original (other than some new areas and a few features of its own). In this version Jack Carver (your character) gains new feral powers, which adds a whole new hand-to-hand combat element to the gameplay.

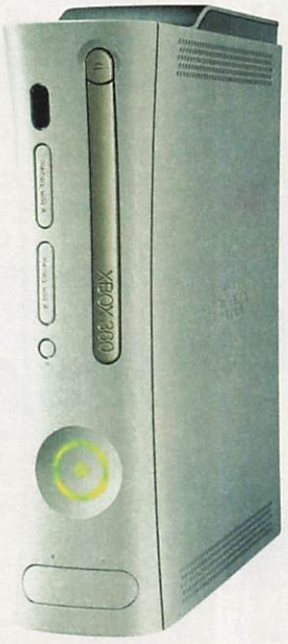
At one point we worried that Instincts was a flubbed port, but we were happy to see that the game has come into its own. Definitely worth a go by console FPS aficionados, and when the single-player is done, you can continue playing on Xbox Live. ▲

$49.99 • ESRB: (M)ature
Ubisoft • www.farcrygame.com

XBOX 360

Microsoft has set a North American launch date for its second generation Xbox: November 22nd. There will be two models available with pricing set at $299.99 and $399.99 for the Xbox 360 Core System and Xbox 360, respectively. A word of advice: The $299.99 Core System is just not a very good deal, especially for a power user.

Unlike the current Xbox, not every 360 will have a hard drive. That means to save games you're required to either purchase a memory card (which adds $39.99 to the price) or the $99.99 20GB detachable hard drive, which comes bundled with the $399.99 model. This latter model also comes with a wireless controller (instead of wired), component HD AV cable, Ethernet cable, headset, and for a limited time, a remote control. Both models will include free Xbox Live support out of the box. This will let 360 users go online and communicate with others. Playing games online, however, will require a subscription.



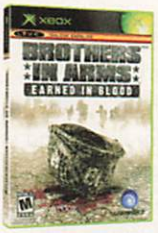
The 360 is likely to be a hot item over Thanksgiving, but there's little reason (unless you're desperate to own one) to buy the high-priced package "deals" listed on the sites of several online retailers. Watch for our full coverage once we've got the hardware in hand. ▲

Microsoft
www.xbox360.com

Halo Triple Pack

What can we say about Halo other than note that it's our favorite series on Xbox? Our passion for each of the titles in this pack is noted clearly if you check this section in the February 2002, January 2005, and September 2005 issues of CPU (or on our Web site). The Triple Pack is the must-have gift for anyone that hasn't played through the series. ▲

$59.99 • ESRB: (M)ature
Microsoft
www.xbox.com



Brothers In Arms: Earned In Blood

Back in June we reviewed the very historically layered Brothers In Arms: Road To Hill 30 (page 89). In this sequel you play Corporal Hartsock (you may remember him from the original) as he leads his team of men on missions through Normandy on a parallel timeline to the original. Ubisoft has adjusted the AI, and the enemies act for more believably. ▲

$49.99 • ESRB: (M)ature
Ubisoft
www.brothersinarmsgame.com/us/earnedinblood

Stubbs The Zombie In Rebel Without A Pulse

Here's an enjoyable, funny, tongue-in-cheek game with copious amounts of gore. What more would you expect when you play a zombie? As in Bullfrog's classic Dungeon Keeper, it's nice to be the bad guy. And human head cheese is the name of the game. ▲

$49.99 • ESRB: (M)ature
Aspyr Media
www.stubbsthezombie.com

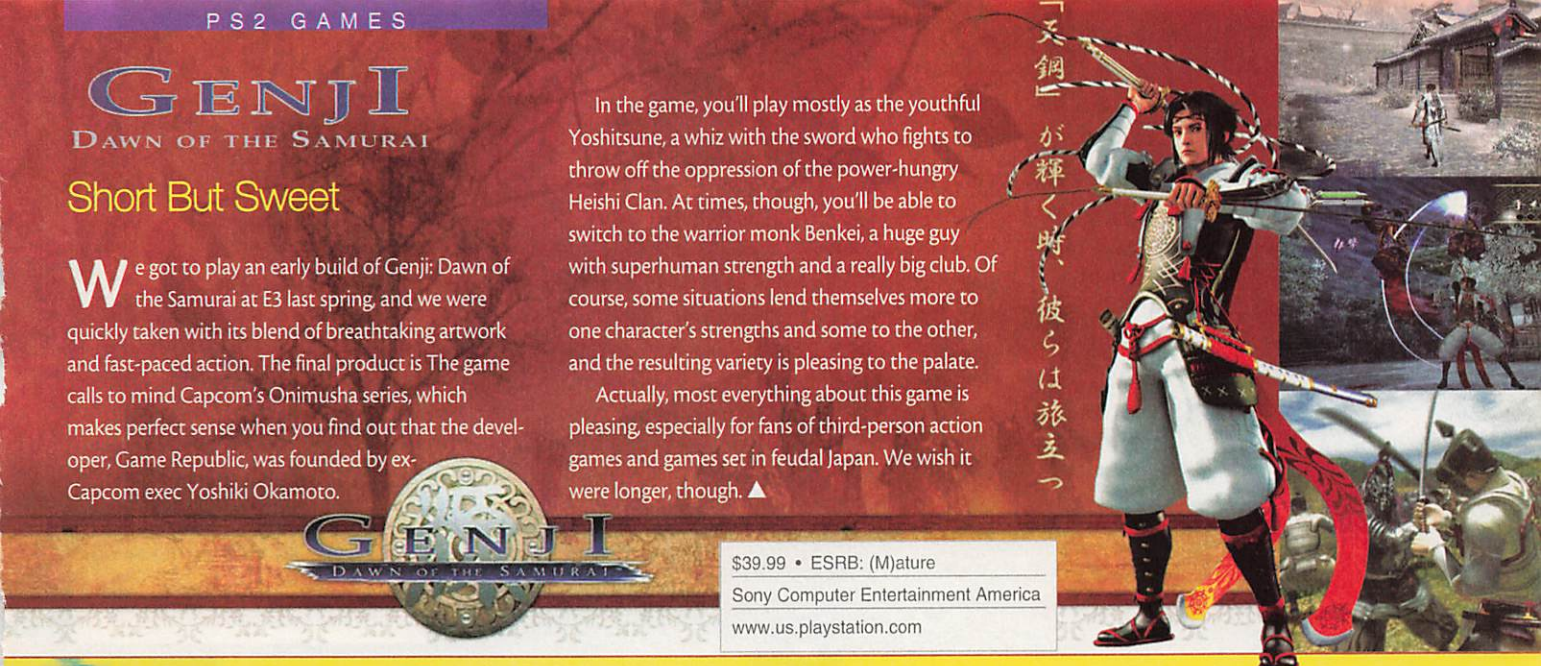
GENJI
DAWN OF THE SAMURAI

Short But Sweet

We got to play an early build of Genji: Dawn of the Samurai at E3 last spring, and we were quickly taken with its blend of breathtaking artwork and fast-paced action. The final product is The game calls to mind Capcom's Onimusha series, which makes perfect sense when you find out that the developer, Game Republic, was founded by ex-Capcom exec Yoshiki Okamoto.

In the game, you'll play mostly as the youthful Yoshitsune, a whiz with the sword who fights to throw off the oppression of the power-hungry Heishi Clan. At times, though, you'll be able to switch to the warrior monk Benkei, a huge guy with superhuman strength and a really big club. Of course, some situations lend themselves more to one character's strengths and some to the other, and the resulting variety is pleasing to the palate.

Actually, most everything about this game is pleasing, especially for fans of third-person action games and games set in feudal Japan. We wish it were longer, though. ▲



$39.99 • ESRB: (M)ature
Sony Computer Entertainment America
www.us.playstation.com

We ♥ Katamari™

This Is How We Roll

OK, we have to admit that we were taken a bit by surprise when Katamari Damacy came along last September and made such a splash. After all, we don't review every single game like the gaming mags do, and we generally try to focus on stuff that we think will interest the *CPU* reader. So the cutesy, highly whimsical game flew right under our radar. Wea culpa.

Of course, if you've played the game, you know that it's far more compelling than one would suspect. So much so, in fact, that it's a little baffling. Who knew rolling a big ball of stuff around the countryside and picking up everything in its path would be so much fun? Namco did, that's who. And now there's a sequel. See, the King of All Cosmos became a celebrity after replacing the stars with the katamaris you made last time, and his fans want more. So he recruits you, playing as either the Prince or one of his cousins, to create even more katamaris, or clumps of stuff.

Thanks to the new two-player co-op mode, you can even share this somewhat bizarre but highly engaging experience with a friend. ▲

$29.99
ESRB: (E)veryone
Namco
katamari.namco.com

Sly 3: Honor Among Thieves

More of same, lovable old Sly Cooper, although the third game in the series includes new playable characters, new items and moves, and new multiplayer modes for playing with or against your mates. ▲

$39.99 • ESRB: (E10+)
Sony Computer Entertainment America
www.us.playstation.com

Legend Of Kay

LoK is a heaps-of-fun action/platform game from Capcom starring martial arts student (and cat) Kay, whose peaceful village is overrun by nasty gorillas. You'll be hard-pressed to get this much fun elsewhere for 30 bones. ▲

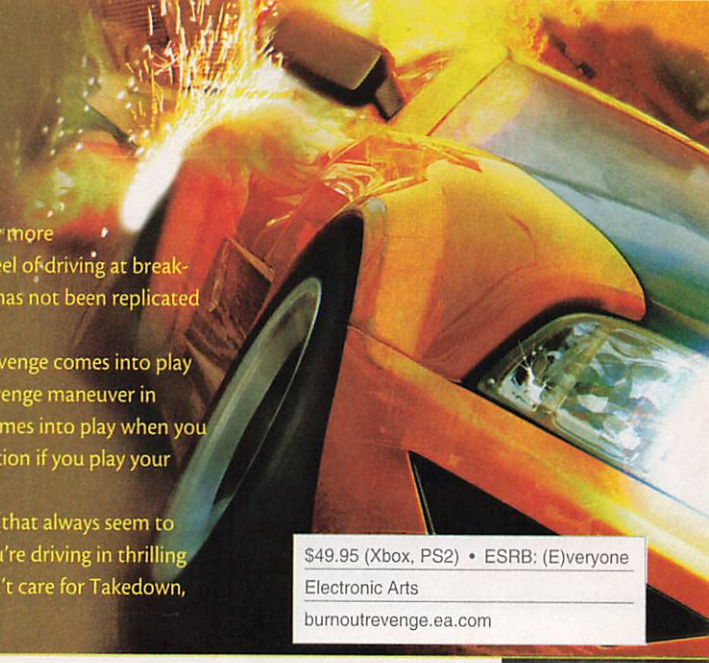
$29.99 • ESRB: (E10+)
Capcom
www.capcom.com

Devil Kings

This Capcom game serves up wave after wave of arcade-style beat-'em-up action, a la Koei's Dynasty Warriors games. Set in a sort of alternate-universe medieval Japan, you'll have access to characters with an unusual blend of edged weapons and firearms. ▲

$39.99 • ESRB: (T)een
Capcom
www.capcom.com

Burnout Revenge



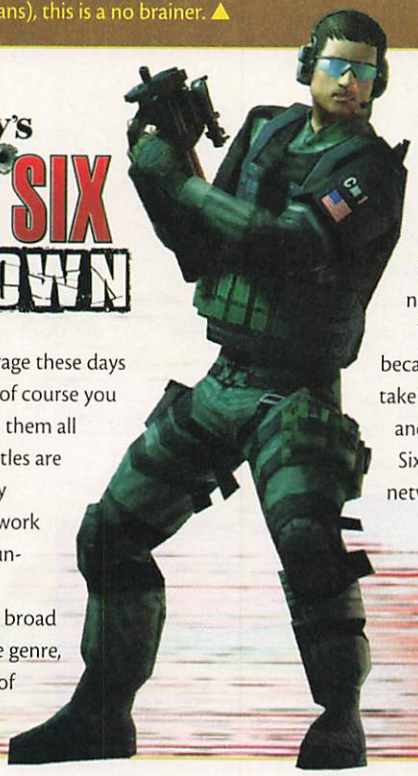
When Burnout 3: Takedown came out last year, it was a revolutionary step forward in the series. By comparison Burnout Revenge is evolutionary and slightly more challenging. The game captures, perhaps even improves on, the adrenaline pumping feel of driving at breakneck speeds. Hit the throttle hard and that feeling of speed you'll discover is one that has not been replicated as well in any other arcade-style racing game we've played.

Fans of Takedown will not have too much trouble acclimatizing to Revenge. The revenge comes into play when normal traffic gets in your way. These cars are earmarked (in bright red) for a revenge maneuver in which you can check the car and send it flying. Another advantage to checking cars comes into play when you have rival racers nearby. You can check a pedestrian car into a rival for instant destruction if you play your cards right. This aspect adds a new dimension to the game's playability.

The tracks are based on real-world locations and offer shortcuts and hidden paths (that always seem to end back up on the main track). These can especially useful and entertaining when you're driving in thrilling multiplayer races on Xbox Live. Don't expect Revenge to change your mind if you didn't care for Takedown, but for everyone else (especially Live fans), this is a no brainer. ▲

$49.95 (Xbox, PS2) • ESRB: (E)veryone
Electronic Arts
burnoutrevenge.ea.com

Tom Clancy's Rainbow Six Lockdown



Squad-based FPS games are all the rage these days and have been for some time, but of course you have to be careful not to try and lump them all into a single category. Some of these titles are fairly realistic, at least inasmuch as they demand sound tactical play and teamwork and penalize trigger-happy run-and-gun-style players.

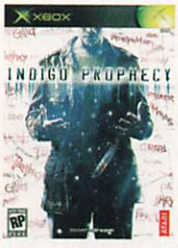
Ubisoft's Tom Clancy games offer a broad spectrum of experiences for fans of the genre, as evidenced by the latest installment of the Rainbow Six series, Lockdown.

This game looks and sounds good, offers comfortable, precise control, and includes the level of online support essential for a game of this kind. But if you've played past RS games, you'll probably notice that Lockdown tends to lean a bit more toward the fast and furious play of a non-squad shooter than the others did.

That's not to say Lockdown isn't worthwhile, because in fact it's quite a bit of fun. You once again take up the role of Ding Chavez, crack commando and all-around tough guy, as he leads his Rainbow Six team in a new kind of fight: A global terrorist network is targeting the team for eradication. ▲

Vision Modes

$49.99 (PS2, Xbox)
ESRB: (M)ature
Ubisoft
www.rainbowsixgame.com



Indigo Prophecy

IP is an interesting blend of cinematic storytelling and interactive gameplay that puts you in the shoes of Lucas Kane, a man who loses control of himself and murders someone. You have to help him find out why and stop the forces at work behind this mysterious crime. ▲

$39.99 (PC, PS2, Xbox) • ESRB: (M)ature
Atari
www.atari.com/indigo

X-Men Legends II: Rise Of Apocalypse

Rise Of Apocalypse is the follow-up to last year's hit action-RPG X-Men Legends. This time, the X-Men must team up with Magneto in order to defeat the considerably evil Apocalypse. ▲

$49.99 (NGC, PS2, Xbox) • ESRB: (T)een
Activision
www.xmenlegends2.com

Ultimate Spider-Man

There have been plenty of games based on Spidey over the years, but this is the first one that truly captures the look and feel of the comics. Play as Spider-Man and Venom, and square off with R.H.I.N.O., Electro, etc. ▲

$49.99 (NGC, PS2, Xbox); $29.99 (PC)
ESRB: (T)een
Activision
www.ultimatespidermangame.com

Software Tips & Projects

Tweak Your Torrents

The BT (BitTorrent) approach to distributing and downloading files can be demanding on your network and PC performance if the client is not properly configured. So, this month we'll show you how to streamline your BT client experience. (Although we used Azureus [www.azureus.com] to illustrate many of these tips, you can still use these techniques in other clients.)

Clear The Router

Many new users of BT clients discover that their router drops its Internet connections frequently and requires rebooting. This occurs because the client is using more simultaneous connections to the Internet than some routers can handle.

BitTorrent doesn't have an easy way to limit connections from within its interface, so dropped-connection sufferers may want to switch to Azureus. In Azureus open the Tools menu, click Options, and highlight the Transfer item. Go to the last box labeled Maximum Number Of Connections Globally. Many routers choke when the client tries to open 300 or more connections at a time, so try putting different figures in this box starting with 200. Experiment to see if your router tolerates increased connections. The problem usually occurs when several torrents are downloading at once, so test the setting by filling your Azureus queue with popular torrents. For the Maximum Number Of Connections Per Torrent box, try dividing the global maximum by the number of torrents you typically have running at once. If you had three files downloading at once, then try putting 300 as your maximum global setting and 100 as your per torrent setting.

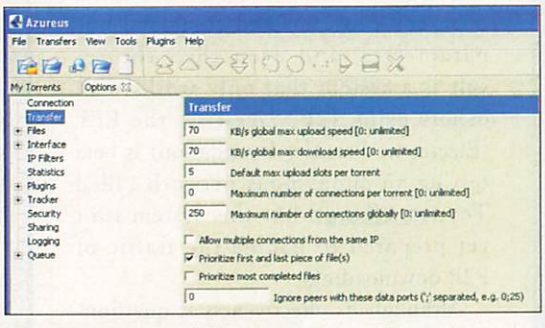
You can also make performance tweaks in the Transfer window. In order to maintain control over the performance hit any BT client makes on your network and PC, put limits on upload and download bandwidth. For instance, in the top two boxes in this Transfer section, decide how much bandwidth you want to allot to torrent exchanges and experiment with how these numbers affect your other online browsing and downloading.

Unclog Torrent Blockages

When you use a BT client such as BitTorrent or Azureus, you may be puzzled by the slow download rate (even with popular torrents). If your PC is sitting behind a router, a firewall, or both, then it's likely that they're blocking ports that let other BT clients download pieces of torrents from you. Any limit you place on sharing torrents with other clients also caps the bandwidth you can use to download. So you need to make a larger range of ports to your network available to others.

With a router, first determine your IP address in the local network. Click Start and Run and type **CMD** in the Open field. At the prompt type **ipconfig** and write down the number you see on the IP Address line. Type **exit** at the prompt to close the window.

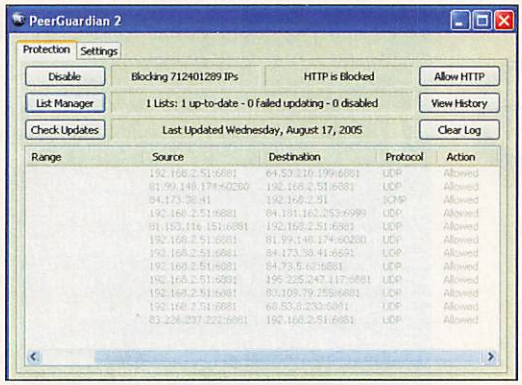
Log onto your router (consult your router's documentation for instructions) so that you can use port forwarding to open a larger range of network ports to your PC. Our Microsoft Broadband router has its port forwarding controls in the Security section labeled as Persistent Port Forwarding, so we'll use this as an example. In the first box, we entered Azureus as a description to remind us why we're opening these ports. In the In-bound ports section, we entered the range 6881-6889, set the type of access to TCP, and entered our IP address in the Private IP Address section. In the Private Ports section, we entered 6881-6889. Finally, we clicked Add and logged out of the router.



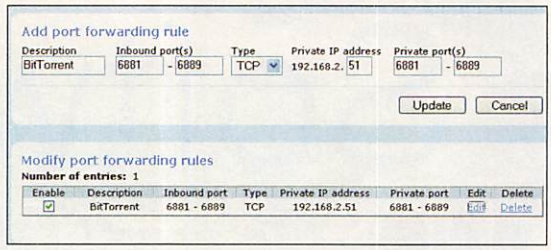
BT clients can overwhelm your router and cause it to lose its Internet connection, so decrease the number of allowable connections.

WinXP Tip Of The Month

Tired of navigating through your entire directory tree to the same folders whenever you want to save something in Word or Outlook? You can customize the My Places shortcut panel on the left side of all Microsoft Office applications by using the Save As command in Word, Outlook, Excel, or any Office application. In the directory tree highlight the folder for which you want a shortcut and click the Tools drop-down menu. Click Add To "My Places," and a shortcut to this folder will appear in the panel to the right of the Save As box in every Office application. ▲



IP blockers such as PeerGuardian 2 are imperfect but try to block IP addresses belonging to media industry snoopers.



Routers can choke your BT client's ability to share torrents unless you use port forwarding.

Get Through The Wall

Even if you have port forwarding set up properly on your router, the software firewalls on your PC still may block incoming port calls. If you're running Windows XP SP2 with the newer Windows Security Center, Windows Firewall may be on by default. To let your BT client work with the ports that the router is forwarding to it, click Start, Settings, Control Panel, and Windows Firewall. Click the Exceptions tab and Add Program. From the list click the client you're using and click OK. This may speed up some BT clients.

However, if things are still sluggish, you need to tell the firewall to open specific ports. In the Windows Firewall Exceptions tab, highlight the BT client and click Add Port. In the next window, type the name of the BT client in the Name field, and in the Port Number box, type 6881. Click the TCP radio button and click OK. Unfortunately, the Windows Firewall won't open up a range of ports in one window, so you need to repeat this procedure for every port number between 6881 and 6889. If you're using Azureus, then you may also try entering these same eight ports with the Add Port function again, but click the UDP radio button. Every third-party firewall program is different, but some such as ZoneAlarm and Norton will let you enter your BT client as an "exception" or a "trusted program" that communicates freely with the Internet without opening specific ports.

Avoid Prying Eyes

As all file sharers know by now, the movie and recording industries actively monitor P2P networks. With the BT protocol, it's easy for them to tap into a torrent and see the IP addresses of the other peers sharing the download. According to Olivier Chalouhi, lead designer of Azureus, the one way to run this program anonymously is to use the beta version of the I2P (www.i2p.net) anonymizer network. Unfortunately, this requires a convoluted installation of several programs and command line parameters, and even then the result is a system that only works with others using I2P. Likewise, the EFF (Electronic Frontier Foundation) is beta testing an anonymous network called Tor (tor.eff.org), but this system isn't yet prepared to handle the traffic of P2P downloading.

Although its effectiveness is questionable, you could install a freeware IP blocker called PeerGuardian 2 (methlabs.org/projects) that blocks incoming traffic from IPs that are known or suspected to be part of the surveillance networks. You can use this if you're running the original BitTorrent client. In Azureus there's a plug-in available called SafePeer that uses a similar block list as PeerGuardian, but it only loads when Azureus does. Use the Plugins menu to open Installation Wizard and follow the prompts until you get a list of plug-ins. Check the SafePeer box and continue through the menus to install it. When you restart Azureus, SafePeer will download the current IP block list (adding about 30 seconds to the load time). CPU

by Steve Smith

Registry Tweak Of The Month

Have you lost the Send To option in your right-click menu? This item lets you send a highlighted file to a mail recipient, a Zip folder, or even a burnable drive, but some utilities and programs make this setting disappear. To get it back on the menu, click Start and Run and type **Regedit** in the Open field. Right-click the Registry key HKEY_CLASSES_ROOT\ALLFILESYSTEMOBJECTS\SHELLEX\CONTEXTMENUHANDLERS. Select New and Key and name this new key Send To. Double-click Default in the right pane and type **{7BA4C740-9E81-11CF-99D3-00AA004AE837}** in the Value Data box. Click OK, and the effect should be immediate. ▲

Infinite Loop

TV-Watching Dogs

Animal Planet's not just for humans anymore. Studies done by the American Kennel Club show that 50% of dogs and cats watch TV. Pets enjoy programming involving animals, and oftentimes run to the back of the TV to see if the animals will emerge from the tube. Behaviorists claim this action supports the idea that animals possess reasoning capabilities. So, get off the couch and take your dog to the park; if she's catching on, you must be really lazy. Next thing we know, FPS will stand for First Paw Shooter. ▲

Source: www.msnbc.msn.com/id/8931355/

Warm Up To Penguins

Resize LVM Partitions, Part I

Some Linux distributions utilize the Logical Volume Manager by default, while other distros provide LVM as an option. Either way, many people use LVM because it's too darn convenient not to. LVM lets you resize your partitions after you've created them, plus it lets you do this over multiple drives. Thus, you could have a single partition actually span three physical hard drives. How cool is that?

LVM is a fairly complex topic, considering all the jargon that's associated with how the manager works. We'll focus here specifically on resizing partitions and provide the lingo you'll need to know. For a more basic introduction to LVM 2, the latest version of LVM, see the LVM HowTo page (tldp.org/HOWTO/LVM-HOWTO/index.html).

Are You Already Using LVM?

Before you plan how to resize partitions, you need to find out if you are actually using LVM already or not. To determine this become the root user and type **lvm vgscan** at a command prompt. Look for output similar to what is shown in Figure 1. If you see the text "found volume group," you're using LVM. If not, you aren't. The techniques we'll discuss here won't work without LVM, and migrating to LVM if you're not already using it can be complex. Migrating to LVM is beyond our scope here, but if you're interested doing so, read the HowTo page first and consider if completely migrating your file system is worth it to you. Also keep LVM in mind for future installations, as many major distros support LVM in their installation routines.

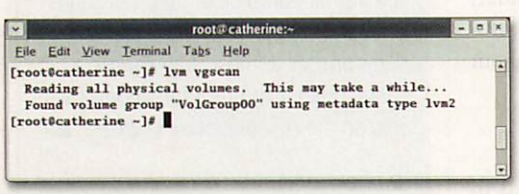

root@catherine:~
File Edit View Terminal Tabs Help
[root@catherine ~]# lvm vgscan
Reading all physical volumes. This may take a while...
Found volume group "VolGroup00" using metadata type lvm2
[root@catherine ~]#

Figure 1. This image shows output from the lvm vgscan command that we ran on a system where LVM was in use. Not all Linux distros will have LVM installed, however.

If you have LVM, you need to determine where in your LVM setup your partition resides. To do this type **df** at a command prompt. The device names may not be the same as what's shown in Figure 2 (taken from Fedora Core), but the path /dev/mapper/VolGroup00-LogVol00 denotes an LVM container. The VolGroup (Volume Group) and LogVol (Logical Volume) terms indicate the container; both of these terms are used to denote parts of an LVM setup. (Other terms are described at the LVM HowTo page.) In our df output, /dev/mapper/VolGroup00-LogVol00 is mounted on the root (/) partition, and there are no other mount points noted as being inside LVM.

It's important that you know exactly what you are working with before you start tweaking your partitions. This includes the underlying file system formatting because you can't just resize the partition without resizing that file system, too. To determine what file system is in use on each partition on your system, type **mount** at a command prompt. From the following line, you can see that the root partition is formatted with the ext3 file system:

/dev/mapper/VolGroup00-LogVol00 on / type ext3 (rw)

Set Up To Continue

In the output from mount, you can also see that the root partition is mounted as read-write, as shown by the (rw). It's not advisable to work with a live (mounted) partition when resizing file systems, but you can't really unmount certain partitions, such as root. You have to boot using rescue media, which can belong to your distribution or a bootable distro, such as INSERT (Inside Security Rescue Toolkit; www.inside-security.de/insert_en.html). Why not default to the ubiquitous Knoppix? Because Knoppix doesn't include support for LVM by default.

dee@catherine:~
File Edit View Terminal Tabs Help
[dee@catherine ~]$ df
Filesystem 1K-blocks Used Available Use% Mounted on
/dev/mapper/VolGroup00-LogVol00
238097040 32808712 193193660 15% /
/dev/hde1 101086 22455 73412 24% /boot
none 517764 0 517764 0% /dev/shm
[dee@catherine ~]$

Figure 2. This output using the df command on a system where LVM is in use shows that only the root partition is within LVM's boundaries.

To download INSERT go to the site and click the Download link in the left margin. Click the Go To Download link, which will take you to a SourceForge.net page. This page is organized in groups, such as insert-1.3.5a, insert-1.3.5, etc. In the top group (which represents the newest release), click the file ending in en.iso to select the English-default release. Clicking this file takes you to a mirror page. Determine the best download site for you and click the download link. After a moment you'll see the Download dialog box.

When you've downloaded the ISO file and are ready to burn it, use software that can properly burn ISO images. The default Windows XP CD burning software, for example, can't. You'll need a program such as Nero if you're burning

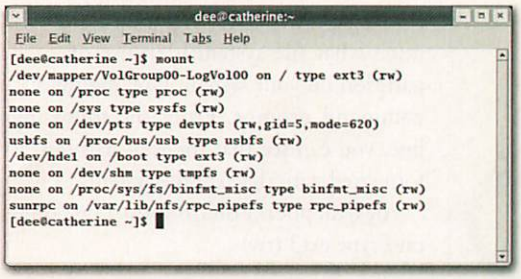

dee@catherine:~
File Edit View Terminal Tabs Help
[dee@catherine ~]$ mount
/dev/mapper/VolGroup00-LogVol00 on / type ext3 (rw)
none on /proc type proc (rw)
none on /sys type sysfs (rw)
none on /dev/pts type devpts (rw,gid=5,mode=620)
usbfs on /proc/bus/usb type usbfs (rw)
/dev/hde1 on /boot type ext3 (rw)
none on /dev/shm type tmpfs (rw)
none on /proc/sys/fs/binfmt_misc type binfmt_misc (rw)
sunrpc on /var/lib/nfs/rpc_pipefs type rpc_pipefs (rw)
[dee@catherine ~]$

Figure 3. This output using the mount command shows that the root partition is formatted using the ext3 file system.

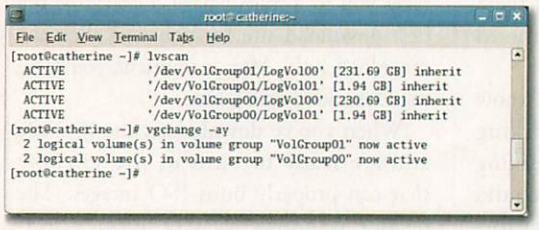
in Windows. You'll also need to configure the software to burn an image and not a file. If the burned CD only has one file on it that ends in ISO, you have burned the ISO as a file and not an image. Instead, you should see multiple files on the CD, such as a full root file system.

Once you have the CD burned, put it in your computer's CD drive and reboot the machine. When you reach the boot prompt, press ENTER. You'll see a lot of text scroll by as the live environment loads. After the interface launches, right-click the Desktop and choose Terminal Session and then Rxvt – Super User. You're now ready to work with your LVM-contained file systems.

Access Partitions & Plan Partition Resizes

Before you can resize your partitions, you must be able to access them. To do this you must load the LVM framework. First, in your root terminal session, type **lvscan**. This command searches for LVM Logical Volumes and lists the ones it finds. Next, type **vgchange -ay** to make these Logical Volumes available to access. Each Logical Volume is a partition.

What you do from here depends on whether you're making partitions larger or smaller. If you're making them larger, you need to make sure you have the required space on the drives and within the LVM framework. If not you will need to add the necessary resources. You will actually increase the LVM portion first and then expand the file system formatting. The process is reversed if you're shrinking partitions: You will shrink the file system first and then shrink the LVM container. Either way, you can't access the file system without accessing the LVM framework, which we've just detailed.


root@catherine:~
File Edit View Terminal Tabs Help
[root@catherine ~]# lvscan
ACTIVE '/dev/VolGroup01/LogVol00' [231.69 GB] inherit
ACTIVE '/dev/VolGroup01/LogVol01' [1.94 GB] inherit
ACTIVE '/dev/VolGroup00/LogVol00' [230.69 GB] inherit
ACTIVE '/dev/VolGroup00/LogVol01' [1.94 GB] inherit
[root@catherine ~]# vgchange -ay
2 logical volume(s) in volume group "VolGroup01" now active
2 logical volume(s) in volume group "VolGroup00" now active
[root@catherine ~]#

You will see something similar to this text when loading an existing LVM framework.

Let's say we want to grow a partition. As mentioned, we need to make sure there's space to do so. We can check the space on each drive by typing **fdisk -l**, using the cylinder counts to determine if we have free space on our drives. Look within the fdisk output for the drive's second line, which may appear similar to this:

16 heads, 63 sectors/track, 39703 cylinders

This tells us the disk has 39,703 cylinders. Now look at the Start and End points of each partition on the drive. Our example starts at cylinder 1 and ends at 203 and the second partition from 204 to 39,703. Therefore, this disk is fully in use, even if there's free space inside the partitions. We would need to add a new physical drive before we could grow any partitions, or we could shrink other partitions first.

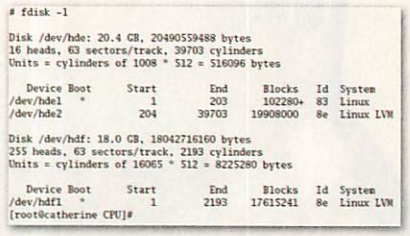
Let's say our partitions spanned from cylinders 1 to 20,000. That would mean we still had 19,703 cylinders still available. The following line tells us how many bytes are in a cylinder, which in this case there are 516,096:

Units = cylinders of 1008 * 512 = 516096 bytes

If we had 19,703 cylinders free with 516,096 bytes in a cylinder, we'd have 10,168,639,488 bytes available, giving us about 9.5GB to play with.

What's In A Partition?

Many skills are required to resize LVM partitions. These skills are well worth reviewing, though, as they're useful in numerous ways when administering your system. Shrinking and stretching partitions makes LVM a lifesaver when you really want to avoid the possibility of manually migrating parts of your file system to other drives to free up room. Next month, we'll learn more about these skills and related LVM tools. CPU


fdisk -l
Disk /dev/hde: 20.4 GB, 20490559488 bytes
16 heads, 63 sectors/track, 39703 cylinders
Units = cylinders of 1008 * 512 = 516096 bytes
Device Boot Start End Blocks Id System
/dev/hde1 * 1 203 102280+ 83 Linux
/dev/hde2 204 39703 19908000 8e Linux LVM
Disk /dev/hdf: 18.0 GB, 18042716160 bytes
255 heads, 63 sectors/track, 2193 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Device Boot Start End Blocks Id System
/dev/hdf1 * 1 2193 17615241 8e Linux LVM
[root@catherine CPU]#

To view the hard drives on your system and exactly what partitions they contain, you can type **fdisk -l** at a command prompt.

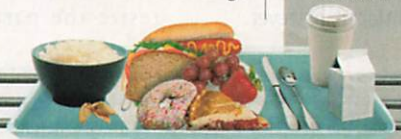
by Dee-Ann LeBlanc

Infinite Loop

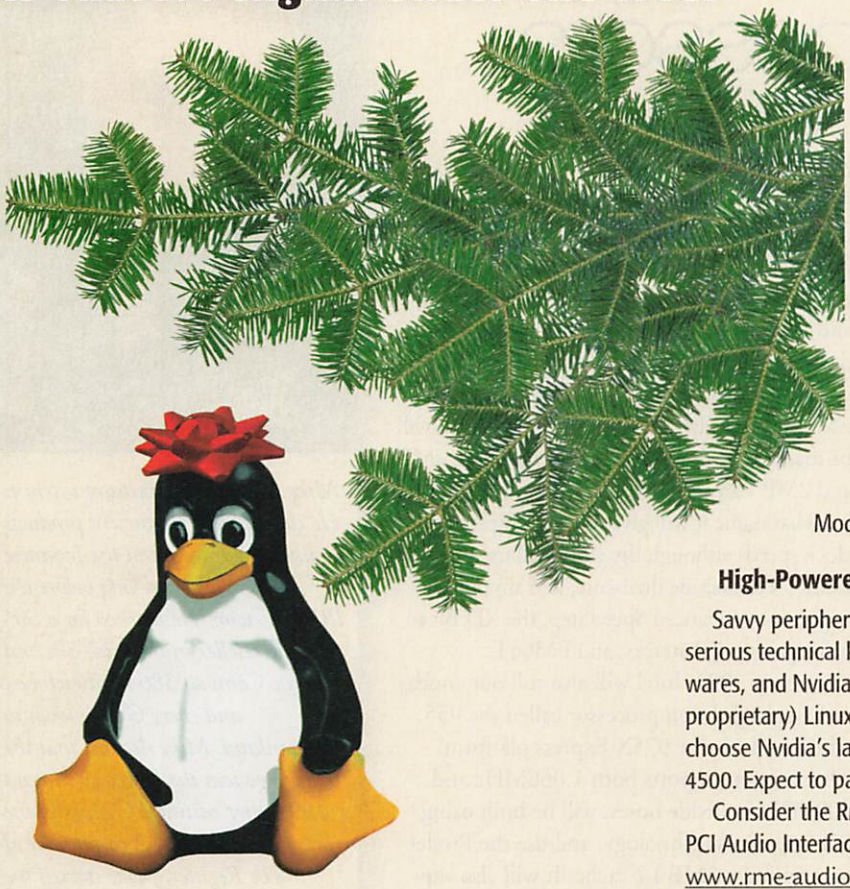
I'll Have A Sloppy Joe, Cathy

A school district in suburban Dallas, Texas, recently launched a virtual cafeteria that students can access to select meals. The Web site lists daily menus available at each school and is intended to help students and parents understand the nutritional value of foods. Virtual lunch lady, Cathy, evaluates the foods students drag to a virtual lunch tray using a mouse. As they add and subtract food from the tray, the program tallies the nutritional value of their selections and totals the price of the meal. Cathy sings praises to those who choose a salad, but not so much for students who pile on the chocolate chip cookies. ▲

Sources:
www.msnbc.msn.com/id/9041827studentnutrition
.cfbisd.edu/content/story.aspx?type=custom
content&sid=1033529



Is That A Penguin Under The Tree?



You can afford to save on gifts for your favorite Linuxophile because he or she probably already has cubic yards of spare hardware components. But if you must, you're safe with peripherals that are compatible with Mac OS X and Windows, and many vendors now explicitly support Linux.

Charity Begins At The Home PC

Get that hard-core free-software idealist on your list an associate membership in the Free Software Foundation (www.fsf.org) with any donation more than $120. The donation is tax deductible, plus you get a bootable GNU/Linux business card distro based on LNX-BBC; a copy of Richard Stallman's book "Free Software Free Society"; and a 20% discount on FSF books, CDs, and assorted swag. Not into FSF? Almost every free or open-source project happily accepts donations, and many sell various logo-crusted gewgaws and T-shirts via CafePress.com.

1337 Keyboards

Pool hustlers carry their own custom cues; geeks carry their own custom keyboards. The Das Keyboard ($79.95; www.daskeyboard.com) is a "stealth" board with blank keys. It may take some time to incorporate muscle memories of key locations, but it's a premium keyboard engineered for comfort and efficiency that works with PCs and Macs—and the Windows key works under Linux, too.

The Happy Hacking Keyboard ($139; www.pfu.fujitsu.com/en/hhkeyboard) has just 60 keys but offers standard keyboard layout spacing. How? By eliminating duplicate keys and combining cursor movement, Function, and meta keys. Smaller than a sheet of paper and compatible with Windows, Unix, Macintosh, and SUN SPARC, the HHK Professional ($269) sports high-end electric capacitance keys for great touch typing. The HHK Lite 2 ($69) uses membrane switched keys and has two USB ports. The HHK Professional-Blank Key Top Model ($269) has blank keys.

High-Powered "Greeting" Cards

Savvy peripheral makers know the Linux community represents serious technical know-how for debugging and improving their wares, and Nvidia leads the graphics card pack with its own (albeit proprietary) Linux drivers. Open-source aficionados can safely choose Nvidia's latest and greatest workstation/gamer Quadro FX 4500. Expect to pay a couple thousand dollars, though.

Consider the RME Hammerfall HDSP 9632's industrial strength PCI Audio Interface for your favorite Linux-loving audiophile ($749; www.rme-audio.com/english/hdsp/hdsp9632.htm; available at synthax.com). With full support from the Advanced Linux Sound Architecture, the 9632 offers potential Linux sound with 52 channels and full 24-bit resolution, plus such professional features as 110dB signal-to-noise ratio; optional analog expansion boards; and "TotalMix, a newly developed, high-quality clock generator with total jitter suppression of external clock signals."

Linux On The Go

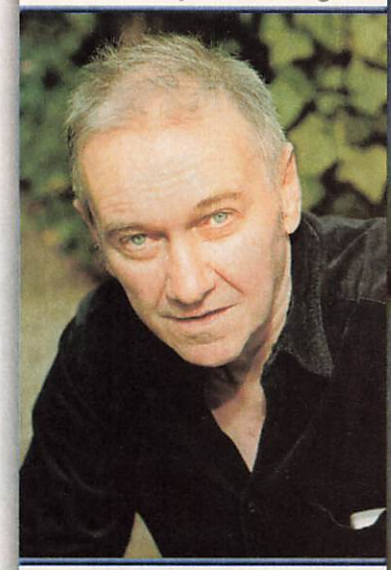
Power and portability make many of the latest Linux-based mobile devices a hit this year. The Nokia 770 Internet Tablet (pricing still unannounced) has a hi-res 800 x 480 touchscreen, Blue tooth and WLAN 802.11b/g connectivity, and Linux-based Internet Tablet 2005 software for instant wireless access to streaming music and video and other Internet apps.

For the techno thrill-seeker, the Sharp Zaurus SL-C3100 (about $850) is a Linux-powered PDA/multimedia player with a 640 x 480 color display and 4GB hard drive. This Zaurus is distributed in the United States through such resellers as Kemplar, Dynamism, and Red Nova. You may run across Kanji instead of ASCII characters, as not everything in the OS has been translated to English, but this is a full Linux distro with all the apps you need (word processor, spreadsheet, email, browser, etc.). ▲

by Pete Loshin

Exciting Times Ahead For Intel Processors

by Mike Magee



Mike Magee is an industry veteran. He cut his teeth on ancient products like the Dragon and the Japanese PC platforms long before the IBM-PC won. He worked for a corporate reseller in the mid-'80s and saw the Compaq 386 sandwich box and every GUI known to humankind. Mike decided that the way to go was the Interweb around 1994 after editing PC mags in the late '80s and '90s. A co-founder of The Register, Mike started the chip-driven INQUIRER (www.theinquirer.net) in 2001. He has contacts from top to bottom in the business, spanning the entire chain, who help him root out interesting rumours and speculation.

Intel made a big play at its Fall Developer Jamboree about a reference platform it would introduce next year and called Viiv, a term that rhymes with five. But according to sources close to the action, we'll see machines using both Yonah dual-core CPUs and the 945GT Express chipset, as well as more conventional machines using Pentium Extreme Edition and Pentium D processors.

Yonah is the codename for Intel's next-generation notebook processor, developed at its research and development facility in Israel. Intel's on target to release this early in 2006, and there will be several variants of the processor, including low-power, single-core versions.

What's the significance of this move? It means that Intel has finally realised that not everyone wants a big beige chassis with a power-eating processor that needs specialist equipment to keep the noise of the fans down and needs even more equipment to keep the processor cool.

Yonah is no power consumption guzzler, and as well as using it in notebooks, Intel expects manufacturers to use it in slim desktop PCs, too, where we're sure it will prove profitable. The Viiv dimension means that Intel wants manufacturers to build slim machines, which will sit inobtrusively in your living room without belting out heat, noise, and suffering the Blue Screen of Death every so often. Intel doesn't want us to think of these machines as PCs. The specification for a Viiv machine includes a friendly graphical user interface shell, platform driver software, a remote control, Intel's "high-definition" audio, an NCQ SATA drive, and Windows XP Media Center Edition. These Viiv machines will also include wireless LAN or Gigabit LAN, or perhaps sometimes both. Given the choice of a Viiv machine with an Extreme Edition processor and a Yonah, my money would personally be on the latter. Not that I'd necessarily want my home entertainment system to be run by Microsoft and Intel. The jury is still out on just how home convergence will pan out; the Wintel alliance would love to be the winner, but it's by no means a certainty it will triumph.

And so to non-Viiv CPUs Intel will be releasing in 2006 and 2007. This year has seen Intel tread water on its desktop processors, but during this breathing space, it has been far from idle. Official and unofficial whispers say that Intel's 65nm process is performing well, and this will allow for some new things to be done for the new year and the new year after.

In the second half of 2006, Intel will release its Conroe family of microprocessors, which will be made using 65nm technology and have 4MB and 2MB L2 cache flavours. It hasn't decided yet what name it will give to these chips, nor clock speeds although the chips will use the LGA775 socket, be dual-core, and support virtualisation, enhanced SpeedStep, the XD Bit to help against viral attacks, and EM64T.

In early 2006, Intel will also roll out another Extreme Edition processor called the 955, which will use the 975X Express platform. This chipset supports both 1,066MHz and 800MHz frontside buses, will be built using 65nm process technology, and use the Presler core with 2 x 2MB L2 cache. It will also support SSE2 and SSE3.

Further down the line, and specifically in the second quarter of next year, Intel will release Broadwater chipsets, which will be able to support dual displays and have a new graphics engine. These will support Pentium D 930s and 920s, as well as new members of Intel's 6XX family.

For the first time, it has started telling its manufacturers about the Merom chip, scheduled for the second half of next year. The Merom will support EM64T (a first for a notebook processor), be a dual-core beast, and have 4MB of L2 cache. According to the whispers, this chip is built from the ground up and certainly promises to be a powerhouse. Intel is likely to introduce wireless components, currently code-named Kirtland and Loudon, around about the time it's able to show off Merom.

If Intel can execute on these processors, we're in, at long last, for more exciting times from the chip giant. ▲

. . . as well as using it in notebooks, Intel expects manufacturers to use it in slim desktop PCs . .

Send rumours to "Mad Mike" Magee at Mike@cpumag.com.

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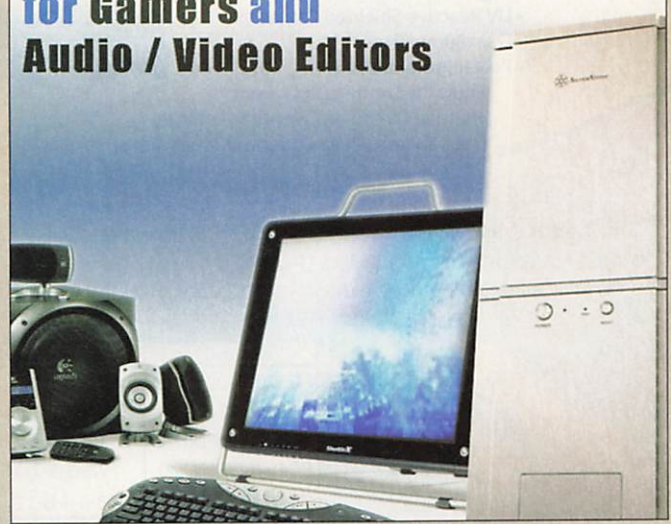

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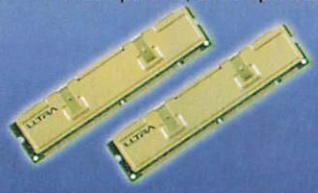

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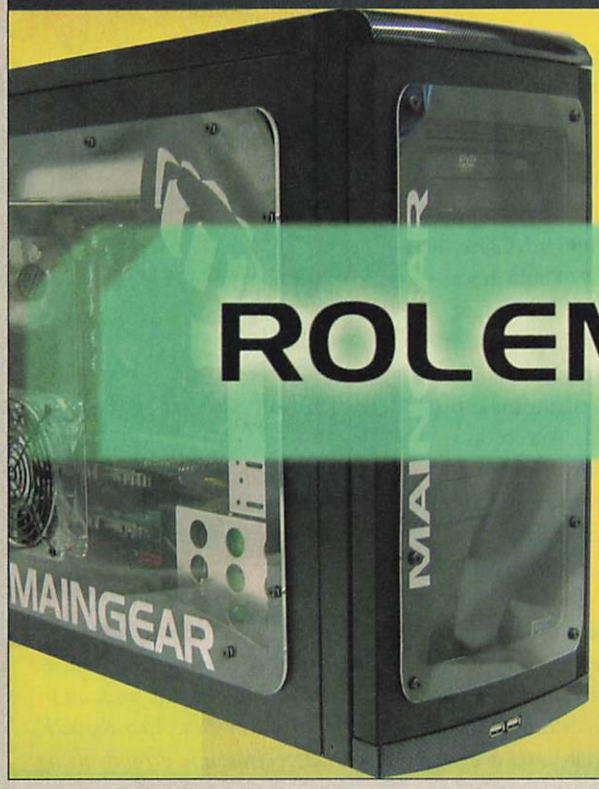

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Hardware Physics Takes A Quantum Leap

Guest Column
by Sanjay Patel

Sanjay Patel cut his teeth with computers playing Hunt The Wumpus on a Tandy TRS-80. Hooked for life, he eventually took a position designing Alpha chips at Digital Equipment Corporation in the early '90s. After the Y2K apocalypse and accompanying destruction of civilization, Sanjay left professional life to teach at the University of Illinois as a professor of Electrical and Computer Engineering. One fateful night, Albert Einstein appeared in a dream and told Sanjay to "go forth and build the first physics processor for games," which led to his current position as chief architect at AGEIA Technologies.

In PC gaming, game enthusiasts have traditionally been hardware enthusiasts. This is partly out of necessity. Like amateur drag racers in the '50s, gamers have been forced to tinker with their hardware to achieve adrenaline-generating performance. But with the emergence of dedicated 3D graphics processors, cheap memory, and faster CPUs, it was soon possible to buy adequate game PCs off the shelf.

Of course, giving more hardware to a software developer is like giving a compulsive gambler a free trip to Vegas. And true to form, game developers soon created a new CPU-cycle hog capable of gumming up the gears of even the baddest game PC. They called it "physics middleware."

Physics adds a new dimension of immersive, real-time interactivity to games. In layman's terms, that means you can crush, mutilate, conquer, and annihilate with reckless abandon. Or, if you deplore violence in games, it lets you create, nurture, and develop sustainably with caring and compassion.

Before game physics, the only way to wreak mayhem was to trigger a preset animation sequence, which in turn displayed a canned visual depiction of a destructive event. This is not true mayhem, but mayhem of the preapproved, physician-supervised variety, and it's just not as fun.

With physics, you take the red pill and are fully immersed in the Matrix. Your every action has an opposite and equal reaction. A moving object continues in a straight line unless acted on by an external force. And you can never exceed the speed of light—unless you're doing some serious overclocking.

There's only one problem: totally immersive physics in software requires a supercomputer. (You'll have one in your cell phone in a few years, but that's further down the roadmap.) Or, you need a *dedicated physics processor* working in concert with the CPU and GPU. Without one, you're back where you started—with, say, 10 to 100 developer-selected objects that are physics-enabled, and the rest static backgrounds or animations. This isn't your developer's fault, it's the limitations of current hardware.

To get an idea of the computational demands, consider that processing each complex collision between two bodies requires on the order of 1 million operations. In a physics system processing 100 colliding pairs at 60fps, this amounts to 6 billion operations each second. To put this in perspective, Congress can take a full 20 minutes to spend $6 billion.

This only gets worse as the number of objects is in the virtual world is scaled upward. Given the phenomenal perceptual capacity of human sensory faculties, a convincing real-time world must include *tens of thousands* of dynamic objects, including smoke, clothing, water, mushroom clouds, and so on. Now you're talking mind-boggling complexity. Think the federal tax code.

But it's not just about quantity; without a hyper-parallelized physics SDK to support it, a physics processor is just a bunch of gates. Hardware-accelerated libraries enable dynamic objects that are complex and deformable, with flexible joints. Collisions between dynamic objects must be detected at every time-step in the simulation. Colliding objects must have their velocities changed or be able to deform or fracture, and this requires numerically intensive dynamics calculations that find solutions to the resulting highly constrained physical systems.

Sure, dual-core CPUs and next-gen GPUs are on the way. But GPUs are designed to process vertices and pixels and are not very good at handling the random data accesses required to traverse the spatial physics data structures. Plus, data dependencies choke GPU pipelines. As for CPUs, they offer small amounts of parallelism for general-purpose operations and do provide floating-point capabilities. But not even the highest-end multicore CPUs offer anywhere near the parallelism required for complex, interactive real-time physics. And even if they did, they are often fully booked just handling the game logic and artificial intelligence.

A physics-specialized processor such as the AGEIA PhysX processor offers the best of the two: good support for data structure access, good support for high-floating point load, and a high degree of parallelism essential for physics processing.

Needless to say, because a physics processor is designed to do physics, it frees up the GPU and CPU for what they do best: pushing pixels and directing gameplay. From each according to his abilities, to each according to his needs. Karl Marx would have loved it. ▲

With physics, you take the red pill and are fully immersed in the Matrix.

Send comments to SanjayP@cpumag.com.

Technically Speaking

An Interview With Udo Eberlein, President Of Nero, Inc.

When German company Ahead (later Nero AG), creator of the famous Nero Burning ROM application, created U.S.-based Nero, Inc. in 2001 and made Udo Eberlein founder and president of the subsidiary, the new company had only three employees and an uphill battle. Eberlein's job was to help transform Nero from being a disc-burning company into a digital media titan. While this fight continues, Eberlein has helped Nero to become one of the top three software solutions in the United States and a rising contender in the fight for whose technology will be at the heart of your media enjoyment in the near future.

by William Van Winkle

CPU: Within the domain that Nero covers, what is the one thing that people need right now that they don't have?

Eberlein: People need HD content. Beyond that people need an easy-to-use, easy-to-understand way of acquiring, playing back, and sharing digital media content in a protected fashion. That's the biggest dilemma the whole industry faces, that there are different DRMs, different codecs, different technologies, and if we as an industry don't alleviate the pain of having to make a technology choice every time a consumer buys a piece of hardware or software, then we've all failed. This becomes even more important over the next five years as we're moving over to HD content.

CPU: Are you involved in the whole HD-DVD vs. Blu-ray situation?

Eberlein: No, we're not involved other than that we support both formats. We have to. We can't afford to lean one way or the other. We would very much like it if there would be one established standard, but it doesn't look like that's happening.

CPU: So we're stuck with Betamax vs. VHS all over again?

Eberlein: I believe so. At least they are agreeing on the same copy protection. I think I saw something today that Blu-ray is now also utilizing ACS for copy protection.

CPU: Why do these format wars keep happening?

Eberlein: Because there are major companies and corporations involved that have patents and marketing budgets and roadmaps that include making money out of some of those patents. It's inevitable, basically. It's not the ideal scenario, and it ultimately results in not providing the ideal scenario for content owners who want to sell their content. This just slows down adoption and the success of both formats, in essence.

CPU: What is Nero Digital?

Eberlein: Nero Digital is a codec. It's basically taking the standard MPEG-4 and adding some nonproprietary extensions to it, meaning subtitles, chapter creation, two audio tracks, and very soon, navigation. It's our implementation of the MPEG-4 standard, but it's 100% standard compliant, including MPEG-4 Part 10, which is AVC [Advanced Video Coding, or H.264]. Therefore it's in an ideal position to take advantage of the next-generation HD technologies, such as HD-DVD, Blu-ray, VOD, and HD broadcasting. It also includes MPEG-4 ASP video, like DivX and Apple; MPEG-4 AAC audio, like iTunes and 3GPP mobile; and the MP4 file container. So from a technology standpoint, it's extremely open, unlike formats such as DivX that use a proprietary container—also unlike Microsoft, Real, and Apple with their proprietary DRM extensions. Basically files created by Nero Digital can be played back on a wide range of hardware and software that already adhere to

the MPEG-4 standard. So it's extremely well-fitted for the future, especially keeping in mind that both HD-DVD and Blu-ray have adopted AVC along with VC-1 [Windows Media 9] as mandatory codecs for next-generation DVD.

CPU: When you started talking about menus and chapters, the first thing that jumped into our heads was, 'Oh, just like DivX 6!'

Eberlein: Yep. The difference is that DivX is proprietary and nonvendor conformed. DivX is in AVI file format. Nero Digital is in MP4 file format. We adhere 100% to the standards; they don't. I mean, I can go on for a long time about the differences, but the main thing is that DivX does not have an answer to any blue laser formats. DivX is stuck in the red laser world and in an AVI file container, which is a basically outdated file format.

CPU: Why won't codec technology designed for red lasers work with blue lasers?

Eberlein: Because it's a totally different technology. I believe they've tried to convert it into a non-AVI file container, but—this is a rumor that I heard in the market space—I heard that they tried and have not done it. And they believe they don't need blue laser. We don't know if they're working on something in the background, but their answer to H.264 was DivX 6 and their own proprietary DivX file container, which is nothing but an additional wrap around an old codec.

CPU: Two years from now when we go buy our first blue laser player, is it going to run our Nero Digital files?

Eberlein: Most likely it will because we're adhering to the standard and are working very hard on getting Nero Digital implemented on the chipsets that go into those players and recorders. Encoding solutions will follow at some point, obviously. But if you don't have support for Nero Digital on that device, then you will not be able to play back the additional features that Nero Digital provides. But because we offer full support for MPEG-4, you'll be able to see the basic video with no problem. So if you have a Nero Digital-enabled player, you can play back DivX content, XviD—and let's not forget that the majority of MPEG-4 content out there isn't DivX; it's XviD, which any Nero Digital implementation can play back.

CPU: And any Nero Digital file will play with no problem on any MPEG-4 PMP device, yes?

Eberlein: Correct. With the exception of Nero Digital extensions because they don't support those yet. Additionally, you can take your PSP and transcode your content to the PSP profile, which is one of the profiles in Nero Recode. Nero Digital or MPEG-4 ASP on the PSP actually looks very nice. Although our implementation of the codec actually beats the reference MPEG-4 encoder quality, according to numerous independent tests online

CPU: Because you're deeply enmeshed with media burning and sharing, what's your stance on fair use and ownership? With the DMCA and such, is the customer in fact losing fair use, or is it just about new rules being needed in a new world?

Eberlein: We know it's a big issue for consumers. And definitely, the world is changing. We see clearly that there is success for music subscription services and increasing acceptance of how digital rights are managed and controlled in connection to burning and content distribution. We are working with a number of industry bodies where future media rights are adopted and set. We're very supportive of an industry-led approach to this rather than something proprietary and restrictive. And I think DRM has an image problem. Everybody thinks DRM is something restrictive whereas we believe—and a lot of the content owners believe, by the way—that DRM is something which allows for additional business models. DRM is copy protection for one, but it has new potential for marketing, as well. As I've said, we believe in industry standards because anything that's proprietary is too restrictive and is a vertical business model. Sure, it's great to have millions of iPods sold, but that's a closed system, and that ultimately hurts the consumer.

CPU: So you're not an iTunes user?

Eberlein: No, I'm not. I use the Yahoo! music engine because that has Nero Digital AAC as part of the codec.

CPU: Should unlimited copying and burning still exist for strictly personal use?

Eberlein: Ultimately the user must understand that even if you go and buy a DVD, and you have the tools to transfer that DVD into a digital file, which you can't do in a legal fashion, you're not owner of the content. You own a license to play that content. You don't own the right to do with that content whatever you please because those are not the rights that you acquired. What is fair use? Quite honestly, it all depends on the content owner. It's their content. They can define what they believe is a fair use.

CPU: How can we expect the core Nero products to change going forward?

Eberlein: The Nero line . . . is going to evolve to cater to more media devices and the whole digital media space. We're moving away from a task-oriented approach to a content-oriented approach. And when I say content-oriented, that includes all digital media, audio, and video, be it streaming, photos on your TV, whatever. But we're not going to start making security software tomorrow if that's your question. The evolution of Nero is always going to be centered around where you can get media and what you can do with it. CPU

Subscribers can read bonus content with Udo Eberlein at
www.cpumag.com/cpunov05/eberlein

by William Van Winkle

Under Development

A Peek At What's Brewing In The Laboratory

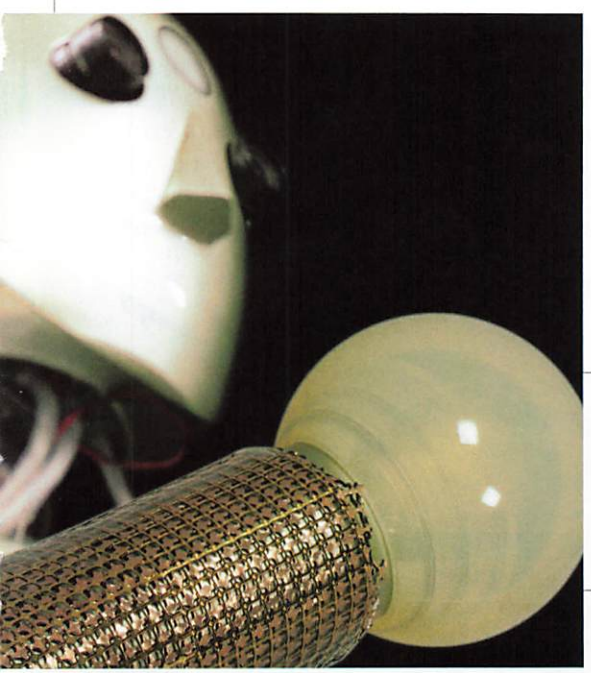
Gimme Some E-skin

Who says robots have no feelings? OK, they don't today, but very shortly, they may be able to feel pressure and heat, much like human skin. Takao Someya and colleagues at the University of Tokyo made their first "E-skin" announcement last year, demonstrating an artificial skin able to detect pressure. But that first-generation E-skin couldn't bend sufficiently or sense temperatures to be called true skin.

Someya's group is back with a new E-skin that solves both problems. Using a net-shaped pressure-sensor array built on a plastic film with organic transistor circuits, the improved sensor matrix is bendable down to a 2mm radius and flexible to a 25% extension. This is sufficient for wrapping around human-sized fingers. The researchers also built a second, independent set of organic semiconductor thermal sensors alongside the pressure sensors in their laminated matrix. Both large-area sensor networks report data simultaneously. The group demonstrated this by wrapping a sensor mesh over the surface of an egg and successfully obtaining data distribution images.

"It will be possible in the near future to make an electronic skin that has functions that human skin lacks by integrating various sensors not only for pressure and temperature, but also for light, humidity, strain, sound, or ultrasonic," says Someya in a paper published in the *Proceedings of the National Academy of Sciences.*

Although no one seems to have raised the subject yet (most likely because of the difficulty involved with successfully interfacing with the nervous system), the prospect of using E-skin to bestow touch back to those people using prosthetic limbs seems too obvious to ignore. If endowed with the additional sensors, perhaps prosthetics may prove even more useful in some situations than their flesh and blood originals. Either way, we now seem a step closer to robots being able to fetch us chilled or heated snacks during extended gaming sessions without them crushing the goods. Perhaps mods will also allow such snackbots to even take over our games so we can have bathroom breaks, too. ▲



Once more with feeling. Japanese researchers have devised a way to let robots feel pressure and temperature via artificial skin.

Radio Reborn

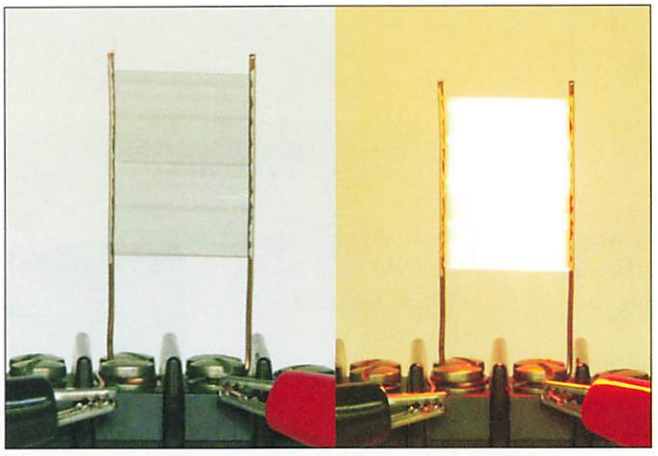
If you thought Sirius and XM were driving terrestrial broadcast radio 6 feet under, think again. Digital radios are just becoming known here, but in Europe they are the hottest consumer electronics devices after MP3 players, growing more than 440% in 2003 alone. There are a few primary technologies afoot in digital radio, one being DRM (Digital Radio Mondiale).

DRM is a nonproprietary technology able to broadcast short-, medium-, and long-wave digital signals in the AM band. DRM lets one radio tower cover a much extended geographic range with near-FM quality. DRM uses two codecs for speech and MPEG-4 AAC for music. DRM works now at frequencies below 30MHz, but the DRM consortium is working to extend this to 120MHz. Testing is expected to complete between 2007 and 2009. The group is also experimenting with simulcasts. Aside from improved fidelity over traditional AM, DRM broadcasts can also carry data and text.

Eureka-147 Digital Audio Broadcasting is a related technology 30-plus countries have embraced, although not the United States because Eureka-147 typically operates in the L band, which is reserved here for military use. Three U.S. companies have joined to create a venture called iBiquity, which will broadcast using lossy compression at up to 128Kbps with a subcarrier channel at up to 64Kbps. Terrestrial DAB broadcasting here has been slow to gain traction because of additional royalties placed on digital broadcasts, while satellite DAB (namely XM and Sirius) has fared better.

This may change with Texas Instruments' HD Radio platform; it takes iBiquity's technology and puts it on a programmable TI DSP. The DRI350 DSP in particular is nifty because it enables DAB, AM/FM, and MP3/WMA decoding on one low-cost chip for receivers. Software programmability enables developers to create next-gen radio features, such as a rewind feature and surround sound. Since DAB appeared in the United States in 1999, cost has hampered it, but new features could give it a new lease on life. ▲

Weaving A Future Of Nanotubes



Carbon nanotubes are shaping as the wonder material of the future. Flexible, highly conductive, and stronger than steel at the same weight, the diminutive structures have been proposed in applications for everything from heating to sensors to artificial muscles. Now, Dr. Ray Baughman, director of the NanoTech Institute at the University of Texas at Dallas, and his team have demonstrated another app for nanotubes: textiles.

The team has devised a new method for producing large volumes of ultra-long nanotubes in a dry state rather than the older, slower wet process. The nanotubes are spun into a yarn that can be woven into a virtually transparent fabric. According to the team, wool textiles are produced at roughly 20 meters per minute. Baughman's crew can achieve up to 7 meters per minute, needing a trillion nanotubes per minute per centimeter of sheet width.

"Carbon nanotubes are known to have very high thermal conductivity," says Baughman. "We developed a process for making carbon nanotube sheets—or really, carbon nanotube textiles—that can use very long carbon nanotubes. This makes them very exciting as devices for transporting heat from electronic components to the heatsink. On other fronts, people are getting very interested about putting computational and display capabilities into textiles. The nanotubes would provide interconnects as well as functional components. We've even demonstrated previously that you can store energy within a carbon nanotube fiber yarn and weave it as a textile."

Last year, people were still talking about embedding flexible substrate displays into clothing, such as jackets and T-shirts. With carbon nanotube yarns, you can add a display to clothing as an appliqué or build it directly into the clothing's fabric. UTD's team has demonstrated using small planes of nanotube fabric as a source of polarized visible and infrared light. Because of their transparency, nanotube sheets can also gather light, and the researchers are exploring ways in which such sheets can benefit solar cell technology. As nanotube sheets seem unaffected at temperatures sufficient to weld Plexiglas, researchers have proposed even using nanotube sheets in car windows both as heating elements and as radio antennas.

You probably won't find a nanotube heatpipe CPU cooler in your stocking this year, but Baughman noted in a *Science* article detailing the work that "rarely is a processing advance so elegantly simple that rapid commercialization seems possible, and rarely does such an advance so quickly enable diverse application demonstrations." ▲

Nokia Preps For TV Phones

Remember Sony's diminutive over-the-air television receiver, the Watchman? Ancient technology. The Finns are ready to do mobile TV up right. Cell phone titan Nokia recently finished the biggest study yet of phone-based digital TV and came to one encouraging conclusion: It works, and it is going to be huge.

Working with Finnish state broadcaster YLE, MTV, and others to perfect its DVB-H (Digital Video Broadcast-Handset) technology, Nokia rounded up 487 pilot participants and charged them about $6 per month to access a variety of regular content, although pay-per-view racing events also proved popular. Each participant was given a Nokia 7710 smartphone to use. Nearly three-quarters of the participants were 40 or younger and 65% were male.

First, Nokia confirmed that its technology was solid. Video looked satisfactory and proved reliable, and DVB-H proved it could distribute content across up to 55 channels. The most popular content was the normal programming users watched on their regular TVs. Next most popular were sports and news broadcasts. Fifty-eight percent using the service said mobile TV will become popular, and 41% indicated they would buy it. The most popular place to watch content was on public transportation. The average viewing time was 20 minutes per day, although "more active" users averaged 30 to 40 minutes.

Nokia hasn't indicated when DVB-H might arrive in North America, but if the download bandwidth exists for solid TV broadcasts, will the upload bandwidth follow to enable decent FPS or cell phone-based video chat? Stay tuned. ▲

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Q&A With Blake Lewin

Blake Lewin is an experimenter. Early on he pursued experimental physics and then experimental electronic music. Then one day in 1990 while working in the music licensing biz, he was reading a *Billboard* article about a new interactive technology called CD-ROM that Warner New Media was applying to music, and the epiphany hit him like a falling Moog synth. Nonlinear computer entertainment was the future, and he's been at Warner/Turner Broadcasting ever since. Now, Lewin is about to reveal his biggest experiment yet, a new online service called GameTap that may take gaming in a wholly new (and old) direction.

Q Games are everywhere. Why does the world need GameTap?

BL Right now, gaming is suffering a lot of what the film industry has suffered: rising cost of production, limited shelf space, and, no offense to the game industry, but reduced creativity because market pressures are causing everybody to make the same type of game. GameTap is equivalent to TV coming along for motion pictures. You now have a 24/7 network in which people can play games in the same way that people can sit down in front of their TVs and just watch programming. Like the TBS and TCM stations, you have this kind of syndication window to go back and watch all your old favorite games.

Q Is there a minimum sustained bandwidth necessary?

BL No. You have to be connected. That's part of the security mechanism. There's a minimal amount of connectivity while you're browsing the service. When you do go to download a game, we'll go out, get the assets, and store it encrypted on your hard drive. GameTap the client application is between 50 and 75 megs. It downloads the game files and code to emulate different platforms, everything from early arcade and console to mid/late console. The latest we go to is Sega Dreamcast and then PC games.

Q GameTap is a flat fee of $14.95 per month. There's no tiering?

BL No. In the future, there's that possibility. We have intentionally left out Mature games for several reasons. You can edit a film and get it to work on the channel. With games we're all about authenticity, and it would be difficult to change a game. So we've cut it off at Teen. That doesn't mean we don't have some great shooters. We have Splinter Cell and Tomb Raider and a bunch of other stuff. But we really want the network to be mainstream and inclusive. Mature games will either become a tier, or perhaps we'll have a spin-off, just like with Cartoon Network we have Adult Swim.

Q What great ideas did you leave on the cutting-room floor when you were prepping GameTap for launch?

BL Boy, one thing I can say that we did leave out and will look to put back in was the multiplayer aspect. We had a lot of technical things to solve in the emulation and the client itself, so we didn't want to muddy the waters too much. And let me clarify that: If the game allowed multiple people to play it, you can still play it on GameTap, you just can't do that across the 'Net yet.

Q What long-term impact do you think GameTap will have on the game industry?

BL My hope and desire is that GameTap will preserve these games. One of the very noncommercial aspects of my desire to create GameTap was based on an idea I had read in an MIT magazine about the disappearance of digital content in our advancing world, either because no one has a floppy drive anymore to find out what's on a disk or it's just disappearing because the hardware doesn't support it anymore. My hope is that GameTap will continue to preserve and keep alive these franchises across time. The other thing that I hope GameTap will enable is to give another channel for games that don't have to have the heavy burden of everything having to be a triple A title, it has to be a shooter, and having to meet this demographic. I think there is a lot creativity out there that I'm sure isn't getting the time of day because nobody can justify focusing their attention on them right now. I hope that GameTap will open that up and will allow people to see that games are an integral part of our lives. And, from simple little puzzle games to the complex almost film-like epics, there is a wide range of games available to be created.

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William Van Winkle began writing for computer magazines in 1996. He was first published in 1990, the same year he took his first job in computers. He and his family live outside Portland, Ore.

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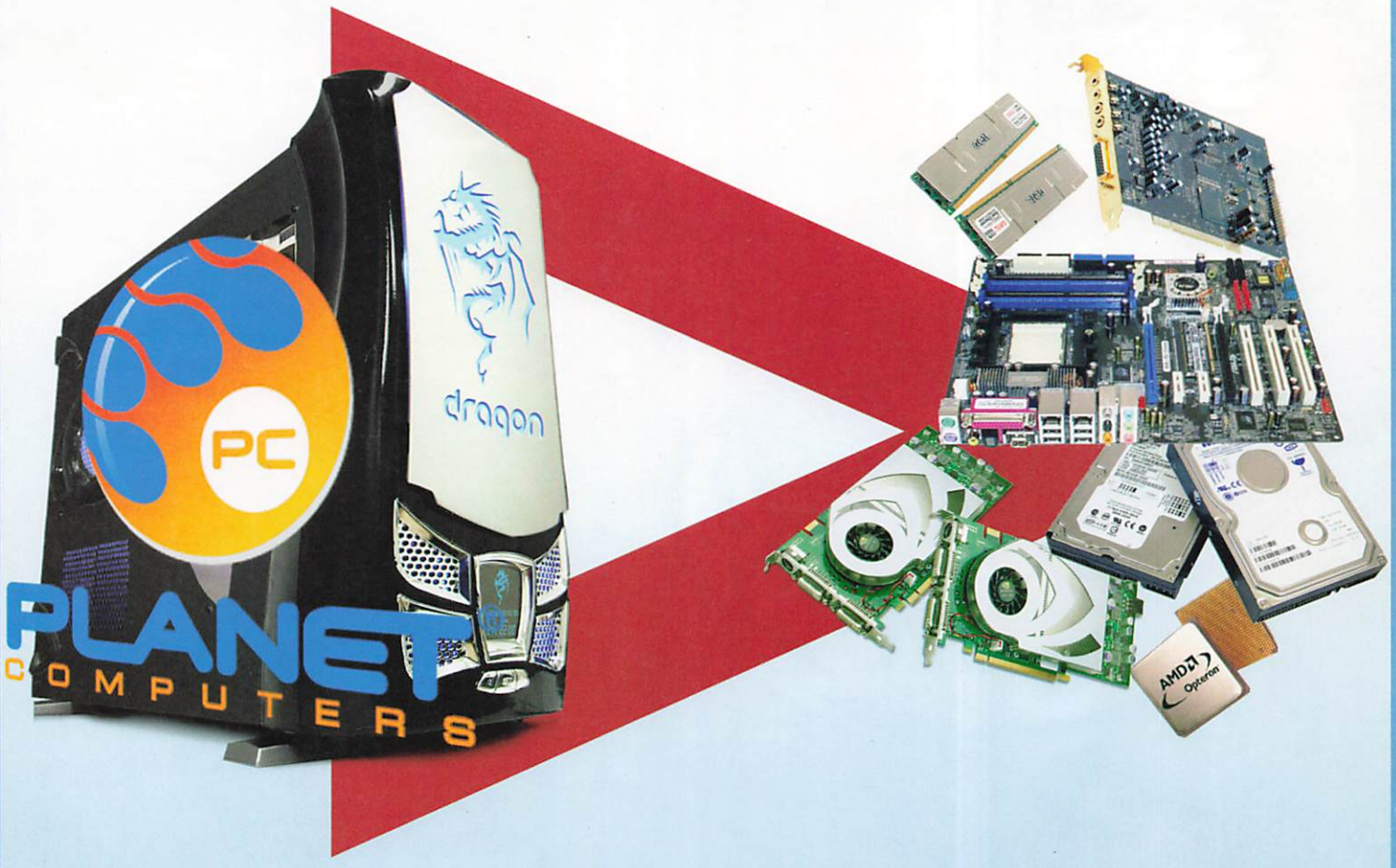

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